$4.00 a Year | Published Monthly | JAN 24 '45 | 50c a Copy

VETERINARY MEDICINE

FEBRUARY 1945

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VOL. XI.
No. 2

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879.

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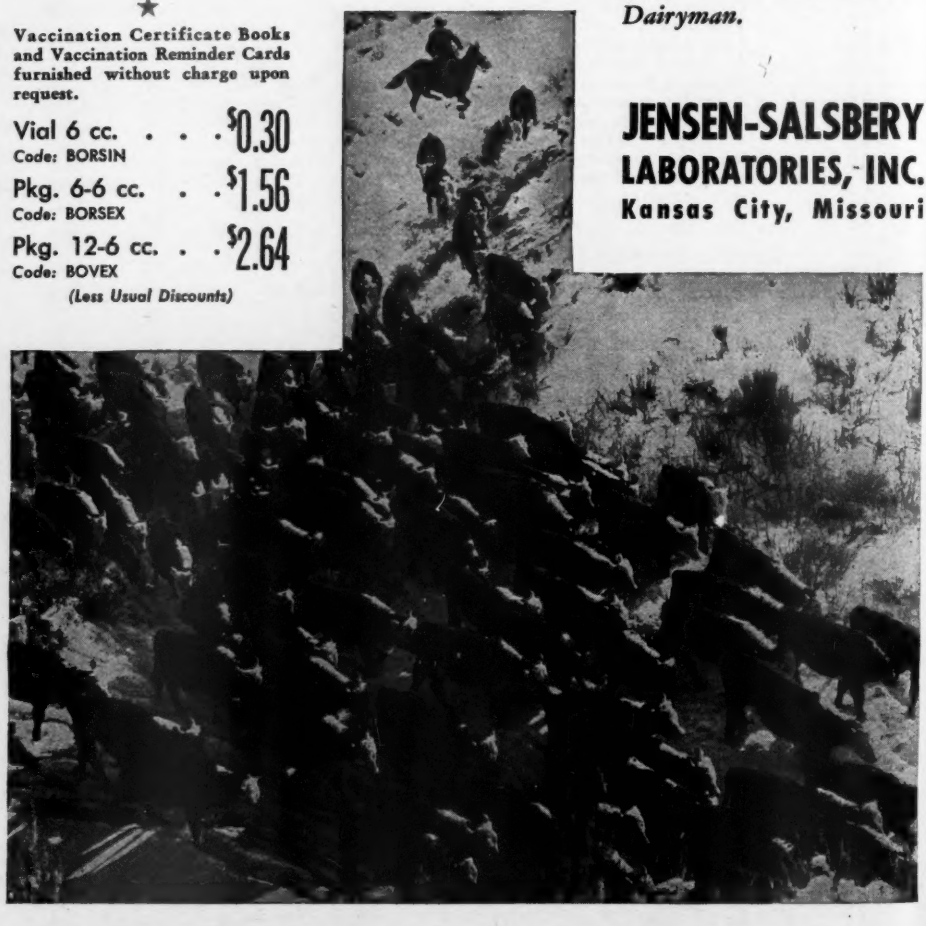

JENSEN-SALSBERY LABORATORIES, INC.
Kansas City, Missouri

VETERINARY MEDICINE

Registered in U. S. Patent Office

VOL. XL FEBRUARY, 1945 No. 2

Published Monthly by the
VETERINARY MAGAZINE CORPORATION
7632 S. CRANDON AVE., CHICAGO 49, ILL., U.S.A.

$4.00 a year; per copy 50 cents; Special Issues $1.00

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Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879. Entered as second-class matter under the title of American Journal of Veterinary Medicine July 19, 1910, at Chicago, Ill., under the Act of March 3, 1879.

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Fox pups are highly susceptible to contaminated meat, particularly if it has been allowed to become warm for a few hours. Fox pups frequently die in large numbers from eating meat that adult foxes may eat with impunity.

British biochemists have tested the use of DDT mixed with paint. An oil-bound water paint to which was added a 5% DDT solution was used on the inside of a cage containing fly pupae. The flies were killed as fast as they were hatched. It was found that the method was just as effective in the room of a house or in a factory canteen.—*Time*, 44:26, p. 70, Dec. 25, 1944.

George W. Stiles, of the U. S. Department of Agriculture field laboratory at Denver reports a considerable loss of turkeys in a flock of 6000 young birds from heat exhaustion. Outdoor shade, better ventilation of the turkey house and a small amount of salt in the drinking water stopped the losses.

The marvelous capacity of the digestive organs of the cow to elaborate a high quality of fats, carbohydrates and proteins from crude and relatively inexpensive raw materials, and to add to them various vitamins of her own manufacture, accounts for her primary importance in agriculture and in the nation's food economy. It is even more surprising that the highly complex digestive system of the cow owes much of its effectiveness to the simplest of organisms—bacteria which, in the field of synthesization, can accomplish that which none of the higher animals can duplicate.

The income from swine in Indiana last year was 224 million dollars; from dairy products 90 and from poultry 84 million. Corn led the farm crops with a production of $40,515,000.

There are 37 official Salmonella typing centers throughout the world. The list of known types of the organism now numbers several score, and the number of wild and domestic animals susceptible to this organism is also large. Included are rats, mice, horses, cattle, sheep, swine, goats, dogs, cats, turkeys, ducks, chickens and many other species. Nearly a dozen types are known to be pathogenic for man.

Simpson of Edinburgh, introduced chloroform anesthesia in Great Britain in 1847. Dadd of Boston, operated upon a horse under chloroform anesthesia in 1856, although anesthesia was not universally used by the medical profession until after the Civil War.

Every case of shock is an emergency and effective therapy based on the application of external heat, administration of fluids, cardiac stimulants, sedatives and individual consideration of the patient takes precedence over every other consideration, except control of hemorrhage.—*Louis B. Becker.*

British Official Photo

When the United Nations' armies invaded Normandy, the domestic animals of the region, like their owners, were unavoidably subjected to many of the ravages of war. However, those animals that escaped death or severe injury were systematically collected behind the lines and every effort made to restore them to their rightful owners. Many of the soldiers voluntarily spent their extremely limited rest periods in caring for the injuries of such animals. Such an instance is shown in the illustration—two British soldiers dressing, not too skilfully, an injury to a civilian horse in Normandy. By the appearance of the wound, the swelling and the nasal discharge, one may speculate that a partially spent bullet entered the face at the small wound anterior and inferior to the eye and emerged at the large wound on the side of the maxilla and that, barring malignant edema infection, the prognosis should be favorable

Chloral Anesthesia in the Horse

The formula of choice for chloral anesthesia in the horse includes, in addition to chloral hydrate, sodium citrate and sodium chloride in the following proportions:

Sodium chloride	4gm
Sodium citrate	25gm
Chloral hydrate	50gm
Water	500cc

Use distilled or boiled water at a temperature of approximately 100° F. First add the sodium chloride then the chloral. Lastly add the sodium citrate in finely powdered form and agitate. Filter through cotton after a few minutes and it is ready for use. The solution should be used while fresh.

Even in large horses, the sodium citrate should not exceed 30gm. For example, in a 1500-pound animal the sodium chloride would be increased to 6gm, the chloral hydrate to 75gm and the water to 750cc, but the sodium citrate only to 30gm. In horses weighing 1200 pounds or less the citrate used is just one-half the amount of the chloral used.

Thirteen mineral elements are known to be essential for animal life—calcium, phosphorus, magnesium sodium, potassium, chlorine, sulfur, iron, copper, manganese, zinc, iodine and cobalt.

Leather Cleaner and Stain Remover

A leather cleaner and stain remover that should be of definite value in the care and renovation of medicine cases, instrument rolls, pocket cases, leather garments, leather upholstery and a host of other hard-to-replace leather articles, can be prepared readily from the following ingredients, one of the most important of which is soap:

Powdered castile soap	6 parts
Water	160 "

Boil together until the soap is dissolved, and then add:

Ammonia	6 parts
Glycerine	14 "
Ethylene dichloride	7 "

★ ★ ★ BUY WAR BONDS ★ ★ ★
AND HOLD THEM

The Registry of Veterinary Pathology

Adding to the many contributions veterinary medicine has made toward the advancement of medical science is the establishment of a Registry of Veterinary Pathology at the Army Institute of Pathology, Army Medical Museum, Washington, D. C. The approval of such an undertaking by the Surgeon General of the United States Army and the American Veterinary Medical Association attests to the importance of pathology in the study of the processes of disease. A better understanding of the effects of disease on animal tissues not only aid in the control and elimination of

Specimens of sarcoma such as this are what the Registry of Veterinary Pathology desire

animal maladies but likewise is often a source of information of value in dealing with human disease problems.

The Registry provides a central institution where specimens of normal and morbid material are available for teaching and research purposes. In addition, the diagnostic facilities of the Army Institute of Pathology are available to the veterinary practitioner who desires to submit material for examination. This service is free of charge. The advantages of such an arrangement will depend entirely on the amount and nature of material submitted to the Registry. While there are a number of excellent sources from which material can be obtained, there is no more important a source than that which the veterinary practitioner can supply. In his daily practice he has access to a wealth of surgical and necropsy specimens which would be invaluable to the Registry collection. In taking advantage of the pathologic diagnostic service, the practicing veterinarian will not only improve the service he renders his clientele, but will at the same time, make available material for use by others. The importance of the practitioner's cooperation in such an enterprise cannot be overemphasized.

As a start, the Registry has already received a large collection of animal neoplasms from one of our leading veterinary pathologists. Also, the Pathological Division of the U. S. Bureau of Animal Industry has contributed considerable material obtained from animals coming to post-mortem inspection at federally inspected meat processing establishments.

The success of the various registries of special fields of pathology maintained at the Army Institute of Pathology can be attributed to the splendid cooperation received from the professions represented. It is hoped that the veterinary profession will be equally responsive to assure the progress of the Registry of Veterinary Pathology.

* * * *

During the two-year period from July 1, 1942, to June 30, 1944, there were 20,337 predatory animals taken by the Predatory Animal Control of Nevada. Among these animals were 18,788 coyotes, 1,541 bobcats, seven mountain lions and one bear. The bulk of reported losses caused by predators during the same period was sheep which totaled 1,423; coyotes being responsible for 1,120, bobcats 140, mountain lions 136. There were 31 deer and more than 700 domestic animals and fowl lost.

* * * *

Liability for Food Poisoning

Over a period of years there has been a definite trend in the law placing greater obligations of care and caution upon the food manufacturer. In a case tried in the state of Massachusetts, the high court there said: "The tendency of courts is to hold the manufacturer of food to a high degree of care because of the serious consequences to human life likely to follow his negligence."

The tendency of the courts to place greater burdens of care on the food manufacturer is based in the main on the legal recognition that there is an imperative need for consumers to rely on the manufacturer's care in preparing foodstuffs and the inability of the consumer to detect injurious and poisonous substances. As society becomes more and more complex, and under the modern method of production and distribution, the courts have slowly recognized the great dependency of the public upon food manufacturers and in later decisions have tended to place increasingly greater responsibility upon the food manufacturer for manufacturing wholesome food.—*Nat'l Provisioner*, 111:23, 1944.

1. First foal born in the U. S. Army in Australia. 2. Member of the Veterinary Corps (left) and Quartermaster warehouseman inspecting beef in a cold storage plant in the U. S. Army base in Newfoundland. 3. Army Veterinarian in Iceland inspecting turkeys for condition before issue to U. S. troops stationed there. One and one-half pounds of turkey per man was provided for Thanksgiving dinner. 4. Lieut. Ladd N. Loomis, V.C. of Detroit passing a stomach tube in one of the Army's animals in Australia. Assisting him are Pfc. Vernon Trobridge, Lexington, Ky. (left) and Sgt. Lewis E. Allen, Denton City, Wash., both of the Veterinary service

Army Swine Farms

Early in this war, the British army in the Middle East established hog farms to provide fresh pork as a supplement to the normal ration issue; to supply variety in the diet and dispose advantageously of the garbage of army camps, hospitals and other installations. The farms are managed by the veterinary corps which employs Italian war prisoners for laborers.

The garbage is cooked before it is fed and is supplemented by the carcasses of army animals that die or are destroyed—these are also boiled before they are fed to the swine.

Each farm has a breeding section where the swine are raised for feeding. The pens which are roofed as a protection from heat as well as the feeding corridors are floored with concrete. In addition the feeders have access to large lots. The garbage is fed in long troughs. Water is kept constantly before the animals and a sewage system spreads the drainage over land on which forage is raised to supplement the garbage feed.

Beside furnishing much desired fresh pork for the troops and being a labor-saving device for the disposal of camp and hospital garbage, these farms are highly profitable economically.

Postwar Refresher Courses for Veterinary Officers

Refresher courses in many fields of veterinary medicine are being planned by practically all of the veterinary colleges in the United States for veterinary officers when they are mustered out of military service. Opportunity for clinical study may also be made available by several public clinics. Veterinary officers who may be interested in such courses should write to the institution of their choice for details.—*Bulletin, U. S. Army Med. Dept.*

Army Citations

Legion of Merit

"William H. Dean, 09888, Colonel, General Staff Corps, Headquarters, Services of Supply, North African Theater of Operations, United States Army, for exceptionally meritorious conduct in the performance of outstanding services during the period 15 December 1943 to 26 May 1944. As head of the Operations Section and later as Assistant Chief of Staff, G-4, Headquarters, Services of Supply, North African Theater of Operations, United States Army, he molded a highly effective administrative supply organization from a limited staff. Under his determined and skillful direction, supplies were invariably available when needed by the combat forces both during the successful amphibious operations at Anzio and later as Fifth Army moved forward in Italy. By his seasoned judgment, keen insight, superior administrative capacity, and resolute devotion to duty, Colonel Dean has rendered significant service to his country so as to reflect credit upon himself and the Army of the United States."

Col. Dean entered service from Pennsylvania and was an officer in the Veterinary Corps before transferring to the General Staff Corps after his arrival in Africa.

Legion of Merit

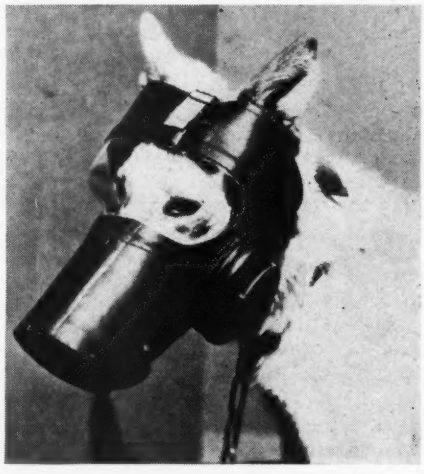
"Major Richard T. Gilyard, 0-311012, Veterinary Corps, Office of the Surgeon. For exceptionally meritorious conduct in the performance of outstanding services in inaugurating a vigorous campaign to eradicate Equine Encephalomyelitis on the island of Trinidad, B. W. I., during the period 1 October 1943 to 20 January 1944. This campaign was expertly organized and guided by Major Gilyard, and because of its vigorous handling, civilian and military loss of life was reduced to a minimum. Major Gilyard, in this campaign, also saved many thousands of dollars for the civilian inhabitants of Trinidad, who own horses, mules and donkeys. In his zeal and compelling sense of duty, Major Gilyard was tireless. In his efforts, in the field, collecting mosquitoes from animals sick and dying of Encephalomyelitis, he displayed a self-sacrificing attitude, knowing well that were he to contact the disease it would most certainly cause his death or permanent disability. Major Gilyard entered the Service 9 March 1942, from Connecticut."

Meritorious Service Award

Announcement is made of the award of the Meritorious Service Unit Plaque, by the Commanding General, Seventh Service Command, on 18 December 1944, to the Medical Detachment (Veterinary Service), 1745th Service Command Unit, Fort Omaha, Nebraska, for its superior performance and outstanding devotion to duty in connection with food inspection activities of this command, during the past two years. This units achieved and maintained a high degree of military and professional efficiency throughout a period of two years as evidenced by superior individual conduct of its personnel, high *esprit de corps*, its superior overall administrative record combined with outstanding discipline and morale.

Quarantine Rabid Wild Animals!

Rabies in dogs and some wild animals is now so widespread that concerted nationwide efforts at its elimination through quarantine are needed.—*J. Am. Med. Ass'n*, 126:10.



Army Signal Corps Photo

GAS MASK FOR WAR DOG

The illustration shows a gas mask developed by the Army Chemical Warfare Service for the use of War Dogs. The mask weighs two pounds and affords protection against chlorine, phosgene and other suffocating gases. It takes but a short time to train dogs to wear this gas mask without protest. A transparent plastic window permits unobstructed vision

Application for Pediculosis in Cattle

Derris (5% rotenone) 50gm
Wettable sulfur 500gm
Water 4000cc
Mix and apply as a spray.

New Names for Milk Product

"Non-fat dry milk solids" or "defatted milk solids" are now the official (and legal) names of what has heretofore been "dry skim milk" or "skim milk powder."

Courtesy National Provisioner

CHAMPION LOAD AT CHICAGO FAT STOCK SHOW

A new record price of $59 per cwt. was paid for this load of Grand Champion Hereford steers which were fed by Karl Hoffman of Ida County, Iowa, and Robert Storz of Omaha, Neb. This marked the third consecutive time that this team has placed first in the carlot showing. The steers averaged only 932 pounds. Karl Hoffman and his father took top honors in the carlot hog division. A new high was established by the entry of 790 steers by members of junior clubs

Of 32 artificial insemination groups (breeding rings) in New York State employing 54 technicians, only two employ veterinarians as technicians. At a recent special course on artificial insemination at Cornell University, of 20 taking the course only two were veterinarians.

A study of breeding records at the U. S. Department of Agriculture Range Livestock Experiment Station at Miles City, Mont., shows that, over an 18-year period, the lowest percentage of calf crop occurred in 4-year-old cows and the highest in cows nine years of age.

Throughout her life the dairy cow is continuously under the nutritional stress imposed by metabolizing large amounts of calcium and phosphorus for the production of milk or for the fetal development of her calf, or both. During gestation and lactation, these elements are metabolized at as great a rate as during the growth period, when the vitamin D requirement is relatively large.

An Australian Guernsey cow, Yarraview Le Mode, recently produced 15,000 pounds of milk and 975 pounds of butterfat in 273 days. Probably a record for that breed.

Ascorbic Acid

Four or five years ago, it was thought and stated with finality that the cow could synthesize all the vitamin C (ascorbic acid) she needed. Now it is agreed that she needs certain other things, but we don't know what, to produce this vitamin. It is also accepted that vitamin C deficiency is one of the common vitamin deficiencies in cattle.

The administration of ascorbic acid intravenously or intramuscularly may increase the vitamin C content of the blood as much as 250%.

Symptoms of ascorbic acid deficiency include: diarrhea, loss of hair, scaly wrinkled skin and stunted growth in calves, and gum lesions and sterility in mature animals. Ascorbic acid, rather than vitamin E, deserves to be called the reproductive vitamin.

Profit in Proved Sires

In a state-wide survey of dairy herd associations in New Jersey, by the Department of Dairy Husbandry of the New Jersey State College of Agriculture, it was found that there was an increase of 9.3% in total milk and 14% in total butterfat in milk produced by "artificial" inseminated daughters over that of their "natural" mothers.

World's Largest Cold Storage Plant

An old limestone mine near Atchison, Kans., has been leased by the War Food Administration for the storage of lard and other food products. The mine, or quarry, is really a giant man-made cave with 12 million cubic feet capacity and capable of holding 3,500 carloads—75,000 tons—of perishable foods. This is nearly one-tenth as great as all the public cooler space now available in the United States. The cave is dry and has railroad sidings and other attributes of a warehouse. A building with the same floor space would cost $15,000,000 to erect. Refrigeration machinery to maintain a temperature of 30 to 32° F. will be installed. The natural temperature of the cave is 50° F. It is insulated with 100 or more feet of stone and earth.

Dormant Hog Cholera Still Dangerous

The combined efforts of swine growers, veterinarians and the anti-hog-cholera serum industry appear to have brought hog cholera under unusually effective control this year, the U. S. Department of Agriculture reports. Department veterinary officials warn, however, that this infectious disease—though apparently dormant in many areas—is still a serious danger to swine that have not been immunized against it.

Throughout the Middle Western States, where the Nation's swine industry is largely concentrated, comparatively few hog cholera losses have occurred this year. Calculations indicate that the quantity of serum used during the first nine months of 1944 was enough to immunize about 43% of the estimated hog production for the current year. In the same months of 1943 enough serum was used to immunize about 46% of the hogs produced during that year.

The total serum released for use during the first nine months of 1944 was approximately 1,286,405,000 cubic centimeters. This amount, if all used and allowing for exports, would be sufficient for about 40,000,000 pigs if treated at weaning age, or fewer if treated when half grown or larger. The total pig crop this year is estimated at about 88,000,000 as compared to 122,000,000 last year.

Dr. William M. MacKellar, in charge of hog-cholera work for the Department's Bureau of Animal Industry, points out that over long periods losses of nonimmune pigs from this disease tend to increase and recede in a wave-like manner. For several years losses have been relatively low. Should history repeat itself there is likelihood of an increase soon, especially if vigilance and protection by immunization are relaxed.

Change of Toms Increases Fertility

Fertility in turkeys, as affected by management practices, was studied at the South Carolina Experiment Station (56th Annual Report). When 18 females in each of two pens were mated with single toms and the toms were not replaced or rotated throughout the breeding season, fertility was 66%. When 45 females in another pen were mated with three toms, which were alternated with three additional toms each week, fertility rose to 86.6%. In still another pen of 16 females, the tom was alternated twice each week and the fertility was 91.4%.

A single experiment conducted on a limited scale may not permit definite conclusions, but the results suggest that the management of the toms affects mating behavior and, therefore, it should be a promising field of study for the improvement of fertility in turkey breeding flocks.—*Everybody's Poultry Magazine.*

Hens Pay Well for Ample Drinking Water

The water supply is so important the whole year around that hens cannot lay for long without it. The supply must be continual, for every time the water pans or fountains are dry, if only for a short time, one may rest assured that egg production will be cut down practically in proportion to the length of time the vessels are dry. Hens need a drink the very minute they leave the roost; this is very important. The water must be pure and fresh at all times, cool in summer and if slightly warm in winter so much the better for egg production as the hens will drink more than if the water is cold.

Since 65 to 67% of an egg is water, it can be easily realized that the hen must have a constant supply of water if she is to manufacture eggs in quantities. Also the hen runs a very high body temperature ranging from 103 to 107° F. when in good health, which calls for water.—*Canadian Countryman.*

Feed Calcium to Laying Hens

Recent tests at the Ohio Agricultural Experiment Station revealed that chickens receiving an ample calcium supplement to their ration laid twice as many eggs as did other pens of birds getting none. Many eggs from birds denied calcium were unmarketable because of thin shells.

Free-choice feeding of oystershell, or other shell equally effective, or feeding high-calcium limestone grit provides the needed calcium. Dolomitic limestone (high in magnesia) is ill-suited to feeding layers and cuts production greatly.

Wax Paper as a Surgical Dressing

The removal of surgical dressings frequently is attended by severe pain. The lack of nonadherent substances in certain installations overseases prompted Captain Richard A. Twyman, M. C., to use wax wrapping paper from cigarette cartons.

This waxed paper for use with surgical dressings is washed with soap and water, then autoclaved. At ¼-inch intervals holes are made to allow escape of drainage from the wound or to permit antiseptic solutions to irrigate its depths. Experience with this material in preventing adherence of surgical dressings has been gratifying in facilitating the removal of gauze dressings and in minimizing the discomfort of this procedure. There has been no evidence of harmful effects from this material.—*The Bulletin, U. S. Army Medical Department.*

Cheddar Cheese and Typhoid Fever

Experience has shown that typhoid-fever epidemics due to cheese have been limited to cheese under three months old, the ripening process being markedly deleterious to the typhoid organism. It is fortunate that this is so. It is understood that, at the outbreak of the war, the military authorities, acting on principle rather than on expediency, prohibited the purchase of cheese under three months old for use in the Army. That practice has, it is said, maintained the Army free from any outbreaks of typhoid infection due to cheese and at the same time provided a more palatable, even delectable, product for the mess table. But civilians can obtain, for the most part, only unripened cheese, in spite of their ruminating and grumbling at the lack of any nip that bites the tongue and makes one reach for still another piece. Is it impractical to require that cheese for civilian use should similarly be at least three months old? Where do the various departments of agriculture, in their proper concern for the welfare of the cheese-making industry, stand on this question? And where do the various departments of health stand, in their proper concern for the welfare of an unsuspecting and unprotected public? Edt. *Canadian J. Pub. Hlth.*, 35:5, 1944.

If an elephant has five toes in front and four behind, he comes from Asia; if four in front and three behind, he hails from Africa. An elephant from Asia has one tip on the end of his trunk; an African, two. If his trunk is smooth he is Asiatic; if apparently in segments, he is African. The ears of an Asiatic elephant are about two feet long and rather ragged; an African's is about the size of a piano.—Carveth Wells in *Our Dumb Animals.*

Thiamine Destroyed

Some raw fish (smelts, carp, suckers, etc.) and the uncooked scales, heads and viscera destroy thiamine, or prevent its utilization, when mixed with other feeds in the fox ration. Such rations cause chastek paralysis (vitamin B_1 deficiency) in foxes that consume them. The difficulty may be avoided by cooking the fish or offal before it is incorporated in the ration. The fish or fish offal may be fed raw, if it is fed alone not more often than twice weekly; this of course providing the feed for the other five days contains an adequate amount of thiamine for the needs of the animal.

Plans for Demobilization of War Dogs

Plans for the disposal of War Dogs when they are no longer useful to the army have been announced. They are extremely complicated, presumably to avoid objections raised in "write your congressman" letters to the War Department's earlier plan.

As in the earlier plan these dogs will receive training to "demilitarize" them and then be returned to their former owners at the expense of the army, if their owners want them back. A small sampling indicates that a majority of former owners of these dogs do not want them.

Unwanted dogs will be sold through the office of Surplus Property. Prospective buyers will be investigated by Dogs for Defense, Inc., and reported upon. Sales will be made only to prospective purchasers who are approved by this organization. Sales will be made at prices $15 and up. If smoothly and promptly handled the minimum price should cover, possibly, 50% of the cost of making the sale.

★★★ BUY WAR BONDS ★★★
AND HOLD THEM

As the Ides of March Approach

IN FILING income tax returns the following should be remembered if you file on a cash basis:

GROSS INCOME is the total amount of money, other than gifts, received during the year regardless of when services were rendered. Old debts (fees) collected during 1944 are computed as income.

Gross income includes professional fees, money received for sale of medicines, etc., hospital fees and charges for boarding animals, etc., profits from investments and speculation, interest, dividends and any other income derived from any source.

Profits and losses on investments are separated into two categories for taxing purposes—those held less than six months and those held longer. The former are fully taxable or fully deductible. The profits on investments owned more than six months are taxable at a rate not higher than 25%; losses are 50% deductible on income and 50% on capital losses. Net loss is limited to $1,000 to reduce net income—any excess not used may be carried over in the next 5 years.

NET INCOME is the gross income less deductions. Credits against net income are granted for personal exemptions in the computation of the tax.

DEDUCTIONS include the cost of conducting one's practice—the amount paid for drugs, instruments, feed and other supplies, labor, utilities, gasoline, repairs and upkeep of an automobile if used in one's practice, depreciation of automobile and equipment.

There are certain "professional deductions" which a veterinarian may claim that are not specifically allowed by law, but which are usually regarded as coming within the cost of conducting a practice. By common practice these "professional deductions" may not exceed a total of one hundred dollars. They include the cost of subscriptions to professional magazines, professional books, annual dues in professional associations and the cost of attending professional meetings or conferences where attendance is necessary to the conduct of one's practice. These are ordinarily restricted to official conferences, e.g., if one is engaged to some extent in an official brucellosis control program and the state regulatory authority or the federal Inspector-in-Charge calls a conference to discuss matters connected with the official program, or if either official appears on the program of a veterinary association meeting and discusses matters for the information of those engaged in the work, the cost of attending such meetings (within the hundred dollars maximum allowance) is in common usage, deductible as an expense of conducting one's practice. As stated, deductions enumerated in the paragraph are not specifically provided for but most Internal Revenue Collectors seem to regard them as legitimate expenses in the proper conduct of a veterinary practice.

If a veterinarian conducts his practice from his residence as a matter of economy or convenience, only that portion of utilities (heat, electricity, gas, water, etc.) applicable to that portion of the building used for his practice,

is deductible as an expense. However, if he lives at his place of business, e.g., in an apartment over his animal hospital, as a matter of necessity, i.e., he is on call through the 24 hours of the day for attendance in the hospital and would be handicapped in the performance of his duties if he did not live in the building, the whole cost of utilities for his home and his business is deductible as an expense of conducting his practice.

If a veterinarian uses an automobile both for the conduct of his practice and for personal use, only that portion of maintenance and depreciation is deductible which may fairly be charged to the practice, e.g., if driven 25,000 miles during the year, 15,000 for professional calls and 10,000 for personal use, three-fifths of the cost of maintenance and depreciation is deductible as a business expense. The use of an automobile for transportation between one's home and one's office is a personal, not a business or professional use of it.

EXEMPTIONS—Exemptions may be subtracted from the amount of net income, $500 for each person to determine taxable income. $500 if taxpayer is single, $1000 if married and living with wife or husband, and $500 for each dependent. If the taxpayer is in the armed forces he is entitled to an additional $1500. Furthermore "allowances" (rent, subsistence) are not computed as income for those in the armed services. That is to say, only the salary is counted as income.

Enteritis and Mixed Infections in Swine*

By J. D. RAY
Omaha, Nebraska

ENTERITIS and mixed infections in swine make up a big subject and include many of the important problems encountered in swine practice. Old veterinary literature credits its hog cholera with many lesions, that today are known to be due to other causes. The first outbreaks of hog cholera recognized in the United States were in Ohio. At that time, advanced cases of enteritis were considered a form of chronic hog cholera. Other lesions due to bacterial infections were likewise thought to be due to that disease. Separating the various enteric infections of swine and differentiating one from the other has been a slow process, that has extended through the years. But, as a result of this separation, the old picture of hog cholera has been changed materially.

Enteritis in swine is an important condition and its causes are numerous. Infectious enteritis heads the list in importance, but other causes such as parasites, chemical irritants, deficiencies, and allergic conditions must be taken into account.

My discussion will deal with observations in the diagnostic laboratory and field experiences, rather than with a review of the literature.

Salmonellosis

Enteritis due to Salmonella infections, and *Salmonella choleraesuis* in particular, is the most common type of infectious enteritis in swine. (Veterinarians who submit specimens for laboratory examination frequently object to the use of the word "choleraesuis" in reports, because the farmers continue to associate the word with hog cholera. To avoid this objection, the old nomenclature, *Salmonella suipestifer*, is used in reports and inquiries.) Cultures from a small percentage of cases reveal *Salmonella typhi-murium* and an insignificant number of cases have proved to be due to paracolon organisms. Little is known of the significance of the latter. The symptoms and lesions of these three types of infection appear identical. Culturing the organisms is required to differentiate among them.

Emphasis should be placed on acute *S. choleraesuis (suipestifer)* infection in swine. The acute generalized infection is encountered frequently, and heavy losses occur. Enteritis may not be a factor early in the outbreak, but it becomes a problem as the infection progresses in the drove. All ages of swine are susceptible, unless they have developed a resistance from previous exposure. In the acute outbreak, the first animals that sicken may die within 12 to 24 hours after first noted to be ailing. Such pigs show a dejected appearance, arched back, stiff gait with lameness, often knuckle over at fetlock and pastern and may show labored breathing. The temperature is high, reaching 108° F. in some cases. These animals squeal, as if from pain, when touched. As the condition progresses, discoloration of the skin at one or more places is common. The term "blue belly" or "purple belly" describes the lesions although they may be located on other parts of the body. Such lesions are considered pathognomonic of this type of infection. If these discolorations develop, the animal practically always dies although some acutely sick animals lay around for several days and eventually recover, however, they do not make good prospects for pork. Animals that have been down for a time and improve may develop large sloughing areas along the back or sides. In winter, such cases pass as "frozen backs." This is a common lesion also in chronic swine erysipelas and requires differentiation. Likewise, the lameness in *S. choleraesuis* infection is not associated with enlarged joints nor do they warm out of the lameness, as is usually the case in swine erysipelas arthritis. This is an all-important point to look for when the drove is being examined to establish a clinical diagnosis.

Subacute cases of *S. choleraesuis* infection often characterize the initial appearance of the disease in a drove, or they follow acute cases. Such cases show inappetence and the temperature may be up—104 to 105° F. Within a day or so after symptoms are noted, diarrhea is apt to develop and, as diarrhea progresses, loss of weight becomes noticeable. Dehydration and emaciation follow rapidly

*Presented at the annual meeting of the Ohio Veterinary Medical Association, Columbus, Jan. 5-6, 1944.

and chronic enteritis or necrotic enteritis is the common sequel.

Lesions in the acutely sick animal show an enlarged spleen, congested liver and, many times, hemorrhagic lymph glands. The kidneys may show marked petechiasis with irregular hemorrhages. Congestion of the large intestine may or may not be present. (When these lesions are considered, the symptoms are readily explained — spleenitis, hepatitis and nephritis.) Gastritis is not an uncommon lesion early in an outbreak. Frequently, an acute edema of the lungs is the primary lesion in some of the pigs. A few instances have been encountered where this lesion prevailed in all acutely sick pigs and enteritis did not become a factor for 10 days or more after the onset of trouble in the drove. The mortality is apt to be high in pigs with extensive lung involvement. Subacute cases show intestinal infection with more or less exudation. Later, a necrotic condition of the intestine develops, which is in contrast to the congested areas in earlier stages of the disease.

In necrotic enteritis, swine should be placed on a cement floor or in movable houses if they are available

It is not uncommon to encounter a drove of pigs that have been vaccinated and, from all outward appearances, were normal at vaccination time; however, a week to 10 days later they go off in condition and death losses may occur. Necropsies reveal extensive ulceration of the large bowel. No doubt some ulceration was present at the time the pigs were vaccinated but the condition could not be noted clinically. The vaccination of animals which harbor this manner of infection with anti-hog cholera serum and hog cholera virus is apt to cause considerable trouble. What might have been a slow going process suddenly becomes acute, as a result of lowered resistance of the vaccinated pig, during the virus reaction period. To avoid trouble of this kind, it behooves every veterinarian to be careful in selecting droves for vaccination and to see to it that they are healthy and in shape to vaccinate.

Sanitation is an important measure of control in intestinal infections. Muddy lots that have been used for feeding swine a number of years are a potent source of infection. Care should be exercised to prevent feed from becoming contaminated with mud and filth.

Nutrition is an important factor in animal management and it becomes doubly important in ailing swine where a diarrhea is present. Feeding and medication should be free of irritating agents. Dehydration should be counteracted by preventing the loss of body fluids. Body fluids make up the bulk of the liquid in diarrheal discharges. Stimulation of the digestive tract with laxatives exaggerates the problem. Ample fluids, containing the elements lost in the body fluids drained from the system by the diarrhea is theoretically and practically sound medication. Excess mucous is secreted and lost in these cases. This is a heavy drain on the proteins of the body.

When available, skim milk or buttermilk is good diet treatment for enteritis cases. Soaked and medicated feed is widely used. Ground feed is preferable because it is less irritating and promotes water consumption which aids in replacing body fluids lost through diarrhea.

Intravenous injections of saline and glucose solutions have been made in acute cases of *S. choleraesuis* infections with some apparent benefit in so far as prolonging life is concerned. This procedure should be tried out further. Physiologic saline or Ringer's solution containing 5% glucose has been used at the rate of 500 to 600cc for a 200 to 250-pound hog. Repeat if indicated. When hogs become weak and circulation is impaired, it is difficult to make an intravenous injection because of the collapsed veins.

Bacterin therapy is indicated where *S. choleraesuis* is a factor. Acutely sick animals do not respond well to the use of these products but the course of the disease in a drove is affected beneficially. Bacterins have proved to be especially helpful in stimulating an immunity to this infection in animals harboring the organisms or exposed prior to vaccination with anti-hog cholera serum and hog cholera virus. So-called "breaks" following vaccination often are avoided if animals are protected in advance of simultaneous vaccination.

Streptococcic Infections

Streptococcic infections in swine are prevalent in some territories and probably are overlooked in other sections. Droves of pigs have been observed where a number of animals have developed brain involvement, when this infection was present. Respiratory complications are common in such droves. Pigs show exaggerated nervous symptoms, walk continuously—sometimes in a circle—at other times aimlessly about the pen. They may step high with the forefeet giving a peculiar distressed motion. Finally they will become too weak to remain on their feet, but continue the walking movement of the legs as they lie on the ground.

Streptococcic infection of the inner ear is not uncommon. Pigs having this infection usually hold the head to one side—the extent of the lesion in the ear governs the manifestation of symptoms. If the infection spreads to the meninges and brain it is apt to be fatal. A careful necropsy is necessary to verify such a diagnosis as the lesion may be very small due to the limited anatomical area available in the bony structure of the head.

Generalized streptococcic infections do not produce diagnostic lesions and it is necessary to differentiate between hog cholera, generalized Salmonella infection, acute swine erysipelas, pasteurellosis and streptococcic infections. This is best accomplished by means of cultures from suspected tissues.

Nail punctures and skin lesions of various kinds frequently become contaminated with streptococci which may become generalized, causing death of the animal.

Tonsil infection is common in swine. Streptococci play an important role in many of these cases. Veterinarians should make a practice in making post-mortem examinations to examine the tonsils of swine. Many times they are necrotic or otherwise involved and account for the animal being off feed due to the sore throat. If sufficient swelling develops about the throat region, suffocation frequently is the result. In territories where anthrax is present, swine frequently die of throat infections after eating of the carcass of an animal dead of anthrax.

Pyemic arthritis (navel ill), a streptococcic infection in small pigs, is a problem on many farms. It is characterized by a creamy pus in the joint capsules. Usually only young pigs one to three weeks old are involved. Many veterinarians fail to recognize joint involvement in small pigs. Some individuals exhibit peculiar symptoms. A few have been noted to walk on their forefeet, balancing themselves with the nose. This position was assumed because the hock joints were so involved and painful they would not put the feet down. Losses usually are heavy; however, many animals recover after an extended course. As these pigs become older and the joint lesions improve, the pus dries out and accumulates in caseated masses in the joint capsule. This may be overlooked at autopsy. If swine erysipelas is common in a territory, it must be differentiated from this disease.

Arthritis due to swine erysipelas is rarely noticed in pigs under three weeks of age and the contents of the joint capsule is distinct. There is an excess of flaky or cloudy synovia and the soft tissues at the margins of the joint show more or less proliferation, depending on how long the animal has been affected.

Barrow showing pronounced enlargement of the right carpus as compared to the normal left joint. The lack of condition shown here is characteristic of animals severely affected with swine erysipelas

Prevention is the best procedure since treatment of streptococcic arthritis is difficult. Sulfa drugs would be indicated, but the age of the animal and difficulty of administering to nursing pigs makes it impractical unless it is found that the pigs may be medicated indirectly through the milk by dosing the sow.

Once streptococcic arthritis appears on premises, it is apt to be a problem at each succeeding farrowing time. The owner should be warned of this tendency and he should be encouraged to take necessary precautions to eliminate the infection from the swine quarters. Also, there is a possibility that some sows carry this infection without showing evidence of its presence. Such sows could infect their offspring as certain mares transmit similar infections to their colts.

Gastritis, evidenced by vomiting and refusal of feed, may be encountered in swine. Frequently, an autopsy of such an animal shows

little inflammation in the stomach but the wall will be markedly thickened due to an accumulation of edematous fluid in the tissues. Such a stomach wall may become one inch or more thick and appear as a flabby gelatinous mass when handled and incised. This lesion is easily overlooked, especially in larger hogs with the stomach empty. Streptococci usually are isolated from these lesions and have been considered the cause. Bacterins containing these organisms have been used to control the progress of the infection in a drove.

Abscesses in the throat region of swine are becoming more common in recent years. Cultures from the pus in these lesions usually reveal streptococci. However, further careful examination will reveal some variety of actinomyces as a primary factor. Where these throat abscesses become a problem iodine therapy, the same as is used for actinomycosis, gives favorable results in a drove of swine. Actinobacillosis is the term applied by some authorities to this condition in swine.

Infectious Dysentery

Swine dysentery or hemorrhagic dysentery of swine is an important infectious disease and appears to be much more prevalent in Ohio and Indiana than in the Omaha territory. Only limited personal experience has been had with this disease. The specific cause has not been determined, but such bacterial infections as *S. choleraesuis* and streptococci frequently complicate the picture.

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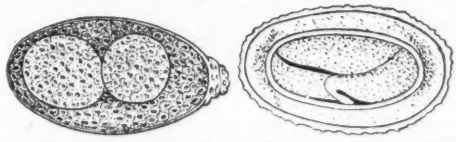
Parasitic Enteritis

Parasites play an important primary role, also, they are a predisposing factor of significance in gastrointestinal complications. Little emphasis has been placed on the small stomach worms of swine. However, it appears to be of considerable importance in gastritis. Some years ago a check was made on its prevalence in swine slaughtered in packing houses. About 95% of the hogs examined harbored one or more species of these parasites in the stomach. Frequently, these stomach worms are overlooked at autopsy.

EGGS OF STOMACH WORMS OF SWINE

***Left, Hyostrongylus rubidus* x 375; after *Marek*. Red stomach worm, 4 to 9mm long**

***Right, Simondsia paradoxa* x 750; after *Cobbold*. Part of female worm may be found lodged in small cyst in stomach wall with slender, anterior portion protruding**



***Left, Gnathostoma hispidum* x 400; from *Ciurea*. Wart-like projection on one pole of egg and body of worm covered with spines; 15 to 45mm long**

***Right, Arduenna strongylina* x about 1000; from *Foster*. Eggs (thick-shelled) which contain larvae when laid by slender whitish worm whose body is often curved in semicircle; 10 to 22mm long**

No information is at hand on the prevalence of the thorn-head worm in Ohio. Precautions should be taken to keep it out of pigs if possible, because of the difficulty of dislodging the parasite once it becomes attached to the bowel wall. Thorn-head worms are best controlled by controlling the consumption of intermediate hosts. The ordinary May beetle and their larval forms (grubs) are the common intermediate hosts for this parasite. They abound about old rotting straw stacks and certain areas of sod. If the parasites have become established on the premises, it is important to keep the pigs away from such grub infested places.

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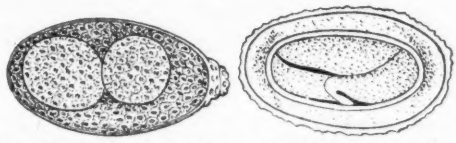

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Nodular worms are more important in swine than is usually recognized. Pigs heavily infested may be constipated and, on autopsy, the small white worms will be found adhering to the outside of the fecal mass in the large

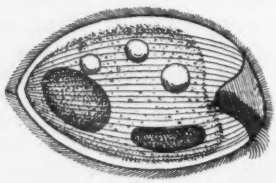
bowel. An excessive coating of mucous usually is observed. When these adult worms are sufficiently numerous, considerable harm is done. A noticeable anemia is frequently associated

Macracanthorhynchus hirudinaceus (Syn. *Echinorhynchus gigas*) from Cameron. The thorn-head worm, natural size, transverse wrinkles and a pale reddish color. The egg (pictured enlarged) is 60 to 110 microns long

with heavy infestation. The nodular worm larva which passes a short part of its life cycle embedded in the mucosa of the bowel wall causes more noticeable lesions and paves the way for bacterial infections to gain entrance into the tissues. The nodules are insignificant in size and difficult to differentiate from certain glands in the mucosa that may become infected. There is no way to attack the larval parasite in the mucosa of the bowel. However, its stay there is short and if the adult parasites are controlled, nodular disease is eliminated. Phenothiazine is of course the anthelmintic of choice in nodular disease.

Balantidiasis

Enteritis due to *Balantidium coli* infection is common in swine in warm weather. These



Balantidium coli (genus of ciliated *Infusoria*); after Leuckart. A protozoa occurring in the large intestine which may be mistaken for a parasite egg

are ciliated protozoan parasites and may become very destructive once they are established on the premises. All ages are susceptible if not previously exposed. Swine develop a tolerance or immunity to them. Gilts that recover from an attack of these parasites may remain carriers and be the source of an outbreak in their pigs when the pigs become a few weeks old.

The symptoms of balantidiasis include acute diarrhea with much mucus and flaky exudate that has been referred to as "clabber milk." An admixture of blood may be present. Animals gaunt up and emaciate rapidly. Losses may be heavy both from deaths and loss of condition of animals that live.

Lesions are found in the large intestine and vary depending on the extent of the invasion of the parasites. The contents of the involved bowel is liquid and little inflammatory reaction is present but the mucosa is swollen and more or less exudation is present. The exudate accumulates on the surface and becomes organized, dislodges and passes out, leaving only a slightly roughened area of mucosa. As bacterial infections become established in the involved area, a necrotic type exudate develops. Usually the protozoa have passed on by this time and the secondary invaders have become the main problem. A microscopic examination of suspected material will demonstrate the parasites if present. Trichomonads produce a picture in the intestine of swine similar to that of balantidiasis and a microscopic examination is required to differentiate the two.

Oil of chenopodium is specific for *Balantidium coli* infection. However, this treatment is contraindicated when infectious enteritis is a complicating factor. A good trial treatment procedure is to medicate a group of the sick pigs if balantidia are numerous. If they respond favorably, the drove may be dosed with reasonable safety. Reinfection will occur if sanitary precautions are not observed.

Amebiasis

A few cases of amebic infection have been seen in pigs but they are not encountered often enough to enable us to know when to suspect them. Microscopic examination is necessary to establish a diagnosis.

Spirochetosis

Spirochete infections cause severe enteritis in swine. Animals develop a copious diarrhea with much mucous that may be blood tinged. They emaciate rapidly and the mortality may be high. Lesions in such cases are not sufficiently diagnostic to identify this infection from others, but it should be suspected when the large bowel wall is found to be swollen, congested and covered with a thick mucous coating. Sometimes the mucus is blood tinged. A microscopic examination of the exudate will reveal myriads of spirochetes if they are the cause.

Arsenic appears to be the best remedial agent for spirochetosis in swine. Fowler's Solution, administered at the rate of one dram per 100 pounds of body weight in slop feed, has given favorable results. This dose can be given once or twice a day for a few days and repeated after a week if indicated.

Nutritional Enteritis

Nicotinic acid or niacin deficiency no doubt plays a role at times in producing lesions in the intestine of swine. However, it is my judgment that its importance has been over-emphasized. The history and feeding will suggest this deficiency, more often than it can be diagnosed from symptoms and lesions.

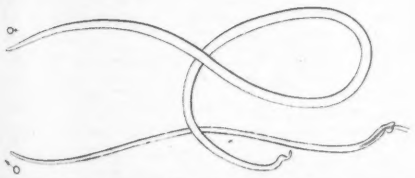
Chemical Irritants

Salt is one of the most common causes of chemical irritation in the digestive tract. Numerous other substances will cause trouble but most of them become available to swine only by accident.

Swine Influenza

Influenza has been more prevalent this season than usual and mortality has been high in many instances. It is difficult at times for farmers to understand how this disease gets started in a drove. A brief review of facts discovered by Dr. Richard E. Shope of the Rockefeller Institute, Princeton, N. J., will help clarify this mystery. Swine lung worms pass through a complicated life cycle, one stage of which is passed in an intermediate host—the common earthworm.

If influenza virus becomes established in a



Metastrongylus elongatus **(common lung worm of swine), after *Neven-Lemaire*. As indicated male and female, three times natural size**

pig, which is harboring lung worms, the worms become infected with the virus and their eggs will carry it. These virus-infected eggs are coughed up by the pig and swallowed, and pass out in the feces. If eaten by earth worms, the eggs hatch and the embryos penetrate the wall of the digestive tract of the earth worm and become established in the body. These young lung worms remain active for a long period. If a pig eats the infected earth worms they are digested. This liberates the lung worm larvae in the gut of the pig and they migrate to the lung where they become established and grow to maturity. The influenza virus incorporated in the original lung worm egg remains active through the life of the larvae in the earthworm and it becomes established in the lung of the hog on completion of the cycle. This virus remains dormant until some predisposing factor lowers the resistance of the pig, at which time it flares up and causes a typical outbreak of "flu." All of the pigs harboring the virus may come down at once if exposed to the same unfavorable conditions. Pigs not infected readily develop the disease from exposure when the virus becomes active in other animals in the drove.

The severity and course of the influenza outbreak in a drove depends upon the predominating bacterial infection associated with the virus. Uncomplicated influenza virus infection produces a simple respiratory disease with few symptoms. Animals manifest a rise of temperature with some inappetence, and a slight cough when disturbed. Such cases improve in a few days with little mortality.

Influenza, as originally recognized in swine, is caused by a combination of the influenza virus and *Hemophilus influenza suis* infections. This combination produces extreme prostration with a high temperature, and animals exhibit paroxysms of coughing when forced to move about. Evidence of lung involvement is noted and after the first day, a thumpy breathing prevails. A rapid loss of weight occurs. This disease runs its acute course in a few days with a high morbidity but mortality rarely exceeds 4 to 5%. Lesions are not extensive and usually an atalacetic type of pneumonia with adjacent lymphatic involvement is about all that is noticeable.

In recent years influenza virus complicated with *pasteurella suiseptica* infection has become a prevalent disease of swine. This combination of conditions accounts for heavy losses in many droves. The initial symptoms resemble those produced by *Hemophilus influenza suis* combined with the virus, but as the course progresses, it becomes evident that pulmonary lesions are more extensive and of a different nature. Animals do not respond to the usual "good nursing" treatment. Instead they develop extensive lung lesions and a heavy death loss may occur early in the outbreak. The course of this type of disease runs 8 to 10 days or longer—depending on the outcome of the lung lesions.

A necropsy of animals dying in the early stages of the disease may show lesions of an acute septicemia, with only slight lesions in the lungs. However, as the pasteurella pneumonia develops, typical hepatized areas prevail in the lung along with edema due to the virus. These lesions are markedly different. Edema of the lungs causes a collapse of the air cells due to the accumulation of fluid in the interstitial tissue. At first the entire lung is involved and after a short time, the fluids gravitate resulting in solidification in the pendent parts. This may begin to clear up immediately. The hepatized areas present a

different picture. They result from the filling of the air spaces by an exudate which becomes organized. The process passes through definite stages—congestion, red hepatization, gray hepatization and resolution or degeneration and necrosis. This requires a definite time to complete the course and any treatment in the meantime shows little benefit except to keep other lesions from forming and hold secondary invaders at a minimum. Pleurisy usually develops over the hepatized lesions and adhesions are common in recovered animals.

Biologic therapy is indicated in these complicated influenza cases. No specific biological product is available to combat influenza virus but the bacterial complications are better controlled by using bacterins or specific antisera. Proper care of animals with respiratory infections is necessary.

Pulmonary Edema

Pulmonary edema is a common lesion in swine. A number of different infections cause this condition. Some of them have been referred to previously, however repetition will help emphasize their importance.

Streptococci probably head the list of organisms causing pulmonary edema. *Salmonella choleraesuis* is a prevalent offender and 5 to 10% of acute cases of swine erysipelas show this type of lesion. Also, corynebacteria frequently are associated with the trouble. Influenza virus and pseudorabies virus (Aujeszky's disease) produce an atelectatic type lung lesion in pigs. Acute edema of the lungs is a common lesion in animals showing allergic reactions. Parasites, foreign bodies or inhaled irritants are possible causes.

Sanitation Programs

Any swine raising program, to be successful, must include sanitation as a major project. On all farms where they make calls, veterinarians should promote sanitation. The McLean County system of swine management is ideal but disappointments occur, even when this system is followed, unless precautions are taken to avoid some of the pitfalls that creep into the project. Frequently farmers report that they have followed a strict sanitaion procedure through the farrowing season, only to be confronted with heavy losses in the pigs farrowed and raised on clean ground. Much of this can be avoided if a close watch is kept of the sows and their litters. Some sows remain carriers of certain infections or parasites, without showing symptoms. Their pigs are apt to become infected, when only a few days or weeks of age. Usually these outbreaks develop in a litter before the pigs are old enough to mingle with pigs in other colony houses. If the owner is alert, such a sow and litter should be removed to a place where they will not expose the remainder of the drove. If this is not done the entire drove will be exposed and the clean quarters contaminated. Then the owner is apt to become discouraged, or even disgusted, and doubt the advisability of going to the extra expense and trouble involved in raising pigs on clean ground. Veterinarians should help their clients avoid such pitfalls. Good advice, at the right time, may not only save pigs for the farmer, but it may prevent embarrassment for the veterinarian at a later date, should he be called upon to treat such an unthrifty drove.

A common condition to be observed on many farms. Pigs root in the wallow for food. Lack of sanitation leads to diseases of many kinds. Hog wallows, parasites and runty pigs are often found together

The Transmission of Glanders from Horse to Man*

By C. D. McGILVRAY
Guelph, Ontario

GLANDERS as a disease of the horse appears to have been recognized and referred to by Hippocrates about the year 425 B.C. Since that time the disease has been constantly referred to in veterinary literature. During the eighteenth century, two conflicting views as to the origin of glanders became evident. One group supported the view that the disease was of contagious origin. Viborg, a Danish veterinarian, published a treatise on glanders in 1797 in which he definitely referred to a specific microbe being present in the purulent nasal discharge and the secretions from pustules and ulcers in the skin. His observations and assumptions were well-founded and were corroborated by the discovery and identification of the *Bacillus mallei (Pfeifferella mallei)* in 1882 by Loeffler and Schutz in Germany, and by Bouchard and Capitan in France. Following this two Russian veterinarians, Helman and Kilning, produced from cultures of the bacillus, the product called mallein which was found to cause a reaction when injected into glandered horses, thus introducing the mallein test for detecting latent cases of the disease. The discovery of the mallein test prepared the way for control and eradication of the disease.

Susceptibility

Glanders is essentially a disease affecting horses, mules and donkeys. Cattle, sheep and swine are virtually immune. Man is quite susceptible. Infection usually occurs by inoculation from the nasal discharges of a diseased horse, in making a post-mortem examination, in examining disease specimens, and while handling laboratory cultures of the bacillus.

Occurrence and Distribution

Glanders was widely prevalent as a disease among horses in Canada until 1915. Since then the disease has been suppressed and at the present time is entirely eradicated. It still prevails to a considerable extent in some parts of Europe, Asia and Africa. The prevalence and distribution of glanders has always increased greatly during and following all the great wars—it may be repeated after this war.

From 1901 to 1904 only clinical cases were dealt with in Manitoba and the mallein test was not used to detect latent cases.

On clinical symptoms only, 60 horses were destroyed in 1901, 50 cases in 1902, 40 in 1903 and 160 in 1904.

During 1905, compulsory notification and slaughter of reactors to the mallein test was instituted. This policy required the slaughter of both clinical and non-clinical cases. The results are shown below:

Year	Horses Tested	Reactors Destroyed	Compensation Paid
1905	1,777	871	$60,053.27
1906	1,403	336	27,207.37
1907	3,065	199	17,303.11
1908	1,319	124	9,304.91
1909	813	70	5,391.27
1910	380	19	1,536.66
1911	930	38	3,389.98
1912	993	24	2,030.00
1913	247	20	1,780.00
1914	733	45	5,313.33
1915	177	4	443.33
1916	37	Nil	Nil
	11,874	1,750	$133,753.23

In addition to the horses shown above 22,481 horses and mules entering from the United States were mallein tested.

In subsequent years only sporadic cases were detected in horses entering Manitoba, so that the disease was almost completely eradicated in 1916.

The suppression and eradication of glanders in the horse has been responsible for the disappearance of glanders in man.

Glanders in Man

While glanders as a disease of the horse was comprehensively referred to as early as 425 B.C., no definite recognition of it as a disease transmissible from horse to man was recorded until the early part of the nineteenth century—the Travers' case, reported in 1830, relates to a veterinary student who became infected while dissecting a glandered donkey in London. From that time cases of glanders in man attracted more attention and many cases have since been recorded in medical and veterinary journals.

William Hunting, F.R.C.V.S., Chief Veterinary Inspector to the London County Council, published a clinical treatise on glanders in 1908. In his monograph he describes 10 cases of glanders in man which occurred between the years 1903 and 1905.

The most comprehensive analysis of cases of glanders in man is recorded in a monograph on the subject published in May, 1906, by G. D. Robins, M.D., of the Royal Victoria Hospital, Montreal. In his treatise, "A Study of Chronic Glanders in Man," Robins made an analysis of 156 cases collected from the literature available at that time, and in 1907 he described 10 cases occurring in Canada. Of these I personally diagnosed and reported two cases in the Province of Manitoba—one in 1905 and the other in 1906.

*Excerpted paragraphs from an article of the same title in the *Canadian J. Pub. Hlth.* 25:7, pp. 268-275, 1944.

Paralysis of the Esophagus in a Milk Goat[1]

By A. J. DURANT and ROBERT CLARK
Columbia, Missouri

THE subject of this article was a registered Toggenburg milk goat with an Advanced Registry record. She was dropped July 8, 1937, and freshened April 4, 1939. At her first freshening she made an A. R. record of 1813.6 pounds of milk and 73.189 pounds of butterfat. She milked fully 10 months. Her high day was 9.16; her high month was 250.8 pounds of milk.

At her second freshening Mar. 29, 1940, she milked 7½ months with a total yield of 1420.6 pounds. The first three months she milked very well. Her high month was 268.9 pounds. After that she went down in milk and lost decidedly in weight during this lactation period. The animal was dried up and allowed to rest, in an effort to regain weight. She came in heat regularly but was not bred for the 1941 season. She came in heat again the next fall and was not bred as she then weighed only 89 pounds.

This goat was received by the Veterinary Department Oct. 24, 1941 for observation and study. At that time a microscopic examniation of the droppings revealed that she was infested with stomach worms, nodular worms and coccidia. She was given a dose of bluestone, followed by phenothiazine. An examination was also made of the uterus by means of a speculum and a slender catheter. Bismuth and oil was injected directly into the uterus by means of the catheter, since it was suspected that the generative organs might be affected.

From the time this animal was received she went down in weight and in condition—she gradually starved to death. Though she was sacrificed for examination, she would not have lived much longer in any case. The injury or cause of the condition probably occurred about three months after Mar. 29, 1940, when she freshened the second time, since she milked very well for the first three months of that period of lactation and then began to go down in milk production and to lose decidedly in weight. The period during which she was affected could have extended and probably did extend, from about June 29, 1940, to Sept. 22, 1942, the date she was killed and at which time she was in the last stages of inanition. Fig. 1 shows the appearance of this goat about two months before she was slain and examined. The rough condition of the hair, the extreme emaciation, with the twisted and abnormal hoof growth and a scaly condition of the skin, was most marked.

Necropsy revealed, chiefly, an extreme emaciation. Aside from some chronic induration of about 80% of the right anterior lobe of the lungs, there were no other evidences of disease except in the throat region. The esophagus was greatly enlarged and filled with food its entire length. The diameter of the organ was approximately 1½ inches. It was flaccid with an entire lack of tone. This condition was observed immediately after the organ was exposed. Normally, the diameter of the esophagus of a goat is about ¼ of an inch and it is practically always devoid of food of any sort, because of the rapidity with which food is passed through it as explained in subsequent quotations from Dukes.

It is the opinion of the authors that this goat could masticate and pass food into the esophagus but that reaching the stomach was a matter of gravity. The esophagus evidently was filled with food and then carried to the stomach by gravitation only. This theory is supported by the fact that ruminants have a very loose operating cardia.

It would appear, therefore, that the most likely cause of the condition of the esophagus in the case of this goat was injury to branches of the vagus nerves controlling the muscular activity of the esophagus, possibly from a blow, which caused a paralysis of the esophagus.

It is most unfortunate that under the circumstances it was not possible to make a study of the nervous mechanism involved in this case. Since, had that been done, a more definite statement could have been made in regard to what may have caused the paralysis.

This case of paralysis of the esophagus in a milk goat is of interest because of its apparent rarity.

Discussion

Uncomplicated paralysis of the esophagus in any animal or in fact, in man, appears to be a rare condition. A cursory perusal of the references reveals only one case reported—in a horse. Naturally anything that would interfere with the normal intake and distribution of food to the digestive tract would be a serious and fatal condition.

In order that a paralysis of the esophagus may better be understood, a discussion of the physiology of this organ with its nervous control is given:

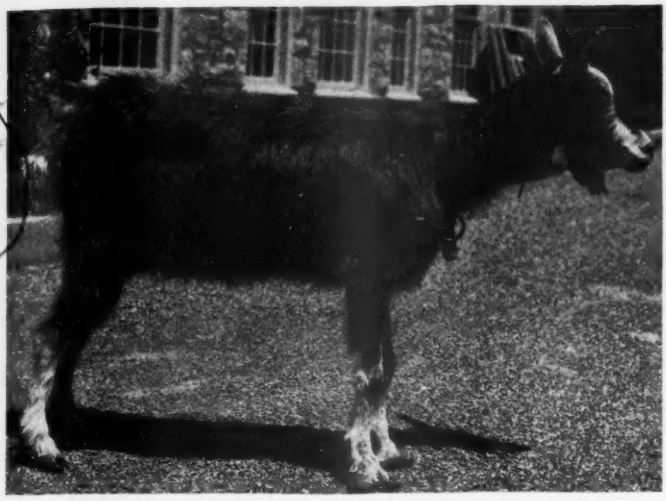
According to Dukes,[2] "A deglutition or swallowing is the act of conveying food from

[1] Contribution from the Department of Veterinary Science, Missouri Agricultural Experiment Station, Journal Series No. 939.

[2] Dukes, H. H., *et al.* The physiology of the domestic animal, 3rd edition, pp. 227-230, 1935.

the mouth through the pharynx and esophagus to the stomach. It is a complex reflex act involving a great number of muscles and their motor nerves, a deglutition center in the medulla oblongata, and afferent nerves with receptors in the mucous membrane of the posterior part of the mouth and pharynx.

"In all animals the wall of the esophagus is made up of four layers: a fibrous coat, the muscular coat, the submucosa and the mucous membrane . . . the ox and sheep have striated muscles throughout." We may assume that a goat also has the same kind of muscles.



The goat was in poor condition. Necropsy showed the esophagus enlarged to about six times normal size

Dukes further states: . . . "the rate of passage of swallowed food is faster in striated than smooth parts. . . . After undergoing appropriate mastication and insalivation, the food is passed by the tongue to the back of the mouth and thence through the isthmus faucium into and through the pharynx and esophagus.

"The muscular force necessary to drive the food through the isthmus faucium and pharynx into the esophagus is derived chiefly from the contraction of the mylohyoid and hyoglossus muscles, although others assist. The former muscle presses the tongue against the hard palate and the latter muscle draws the root of the tongue backward. At the same time the elevation of the soft palate cuts off communication with the nasal passages. The tongue thus acts as a plunger driving the mass of food toward the esophagus. The hyoid bone and the larynx are now pulled forward; thus the entrance into the esophagus is opened. . . . The bolus of food now enters the esophagus. The pharyngeal events of swallowing take place with great rapidity and are difficult to analyze in detail.

"The manner and rate of passage of the bolus through the esophagus vary in different species, in different parts of the esophagus, and with different consistencies of the food mass. Cannon and Moser have studied this question in a number of animals by means of the roentgen ray and otherwise. This method has revealed that in some instances the bolus is carried down solely by peristalsis (a traveling ring of constrictions in a tubular organ caused by contraction of its muscular coat), whereas in other instances it is rapidly shot into the depths of the esophagus. However, even in the latter instances a peristaltic movement of local origin passes over the terminal part of the esophagus and sweeps into the stomach the food mass, which does not come to a pause.

"In the horse solid and semi-solid foods pass by peristalsis alone, at the rate of 35 to 40cm per second. Liquids are squirted down the esophagus by a contraction of the mylohyoid muscles at a rate more than five times as great as the rate of solid or mushy foods. . . . In the ox and in man the condition is similar to that in the horse. . . . In quadrupeds during grazing swallowing has to take place largely against gravity. . . . The deglutition center is made up of a group of nerve cells located in the floor of the fourth ventricle. It presides over the muscles of swallowing and is stimulated by afferent impulses from the sensory spots. . . . The esophagus is supplied with motor nerve fibers by the vagi. In the thoracic portion the esophageal branches of the vagi supply the tube; in the cervical portion the recurrent laryngeal branch, and in the upper cervical part other vagus branches. The splanchnic nerves exert some influence over the terminal part of the esophagus. Primary and secondary peristalsis of the esophagus are dependent on the integrity of the vagus, whereas peristalsis in the smooth-muscle part is of local origin; which means that this part is largely independent of the nervous system as far as motor activity is concerned, and is therefore automatic."

Control of Animal Diseases

By SIR DANIEL CABOT*
London, England

PREVENTION of the introduction of cattle diseases from abroad has been vigorously tackled by the appropriate authorities in Britain ever since the outbreak of war. The maintenance of the health of livestock at a high level was realized as an essential feature of a campaign to conserve food and it was clearly necessary to take the most active precautions to this end.

From the beginning, farmers have been encouraged to seek assistance from veterinarians in animal disease problems; advice has been made available on methods of animal management which would assist in disease prevention; the effort of the rather limited number of veterinarians available has been directed towards the work which could give the greatest contribution to the general plan of food conservation. In addition, research work into methods of prevention, treatment and control of animal disease has been continued and so far as possible research work bearing on immediate problems has been particularly encouraged.

Many infectious diseases of animals which do not exist in Britain are present in other countries with which there is considerable trade and traffic, and care has to be taken to prevent their introduction. Two diseases, foot-and-mouth disease and rabies, will suffice as examples. Foot-and-mouth disease appears from time to time in the British Isles in spite of studied preventive measures. No live susceptible animals may be imported except from countries known to be free of infection and, in fact, it is most exceptional when the disease arises from imported cattle. A vast amount of material is imported to Britain which may have become contaminated, and, although precautions are taken, this may very occasionally be the source of the infection.

The common origin of infection, however, is from imported meat—an essential import if supply is to be maintained. Imported meat may come in contact with our livestock by being included among waste food products fed to pigs particularly and, notwithstanding there is a requirement that foods of animal origin must be boiled for an hour before feeding to livestock, the majority of initial outbreaks of foot-and-mouth disease arise from this source. When an outbreak occurs, affected and contact animals are slaughtered under Government supervision and, as a war time measure, the carcasses of healthy animals are salvaged for human consumption. Animals and material which may have come in contact with infection are traced and dealt with. No movement of stock is allowed in an area around the infected place and careful general precautions are taken to prevent spread of the disease.

In contradistinction it has been possible to exclude rabies from the country for the last 23 years because, with this disease, it is necessary only to control the importation of dogs and cats; these animals are quarantined for six months on arrival at British ports. This regulation has obviously been sufficient to prevent the introduction of the disease.

From January 1, to October 28, 1944, there occurred 126 cases of foot-and-mouth disease, according to Mr. Hudson, Minister of Agriculture for England—of these 59 originated in pigs and 15 occurred on butchers' premises. There have been several other outbreaks among swine since this report was made.

The normal control of contagious and infectious diseases in Britain has been maintained under statutory provisions in relation to diseases of animals. Pleuropneumonia, rinderpest, sheep pox, glanders, epizootic lymphangitis and rabies are now absent from Britain.

No major epizootic has occurred in Britain during the war. Anthrax is found sporadically, but the reduction of imports of foreign feeding stuffs, such as oil cakes and bean meal, and fertilizers such as bone meal, during the war, has lowered the incidence considerably.

Hog cholera is found fairly frequently and is controlled by quarantines imposed on infected premises and contact stock. Considerable progress has been made with a protective vaccine prepared by treating virus blood with crystal-violet to kill the virus. This vaccine has not yet been used extensively, but field experiments indicate that it may make a valuable contribution to the control of this disease.

Sheep scab is now localized to a few of the areas where hill sheep are produced; double

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dipping is used to control it. Very occasional cases of parasitic mange in horses occur.

Tuberculosis in cattle presents a considerable problem. Many of Britain's dairy herds in industrial areas are maintained by purchase of cows, calves are not reared and the animals are not housed under good conditions. Clinical cases of bovine tuberculosis are slaughtered—mainly as a public health measure to protect the milk supply. In addition, a voluntary scheme provides for establishment of herds free of tuberculosis as determined by the tuberculin

Tuberculosis in cattle is a problem in Britain. Clinical cases are slaughtered

test. This scheme has been in force in Britain since 1935, but at the outbreak of war it was thought advisable to maintain only those herds free of disease which had already been so established, so that effort could be directed against more immediate problems. In the last few months, however, it has been possible to revert to the original scope of the scheme and it is hoped that progress towards eradication will now be more rapid.

Farmers have been encouraged to seek advice on animal disease problems from their veterinarians and, in order to stimulate them to do so, a scheme which provides for the control of four of the major diseases of dairy cattle has been in operation for the last two years. The diseases for which this scheme provides are mastitis, bovine brucellosis, infertility and Johne's disease. Under this scheme, farmer and veterinarian sign an agreement to cooperate in controlling these diseases and the farmer pays a fixed fee for the services rendered by his veterinarian.

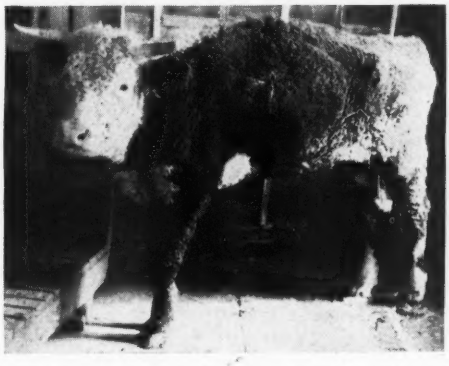
Mastitis is widespread in the herds of the country and is mainly caused by the *Streptococcus agalactiae*. Good methods of milk production and management of the animals assist, greatly, in control and methods of treatment—using sulfanilamide by the mouth or by injection through the teat canal and using acriflavine by udder irrigation—give reasonably good results when cases for treatment are well selected. Research work on mastitis is proceeding, particularly on methods of treatment.

Brucellosis has been responsible for great losses for a number of years. The main line of attack on the disease now is by vaccination with a vaccine produced from the American strain 19 of the organism. Adult cattle as well as calves are vaccinated. Recent experiments have shown that this vaccine affords a good immunity and the observation of results in the field indicates that by means of vaccination the disease can be brought under control.

Infertility may result from a variety of causes; metritis is the main cause and may follow abortion caused either by the Brucella or by *Trichomonas foetus*. Ovarian disease and dysfunction are prominent causes of infertility. A contributary cause may occasionally be dietary deficiencies. The bull has been found to be impotent in a certain percentage of cases.

Generally infertility is approached on the basis of treating the herd as a whole, and routine pregnancy diagnoses are practiced. Uterine irrigation with iodine solution and injection of hormones in suitable cases are found effective.

Johne's disease is not a widespread condition in Britain but it does present difficulty in



Prompt removal of clinical cases of Johne's disease is helpful—vaccination has been tried in a few herds

individual herds. Prompt removal of clinical cases and attention to the most common factors involved in the spread of infection—such as ensuring that cattle cannot contaminate drinking places with infected feces and that farmers appreciate the fact that livestock may pick up infection at an early age—have been helpful. Very little testing with Johnin has been practiced, as this diagnostic agent has not been found sufficiently accurate for practical purposes. In a few herds vaccination is carried out experimentally.

Apart from the diseases mentioned and for

which some organized control exists, there are few diseases of cattle in Britain which present difficulty. Black quarter, for instance, is confined to particular farms on which the disease is known to exist and vaccination of cattle at the susceptible age is sufficient for protection. Trichomoniasis is fairly widespread and is controlled by ensuring a breeding rest over at least two estral periods. Uterine irrigation is sometimes practiced Artificial insemination was introduced in one area (where a communal bull was formerly used) specifically to control this condition.

In the last few years there has been a considerable clearing up of metabolic disturbances in cattle and sheep. The work on milk fever in cattle is well known; it resulted in substituting treatment with calcium boro-gluconate for inflation of the udder; the more rational treatment with a calcium salt gives equally dramatic recovery and there is less likelihood of a cow failing in her milk yield with this treatment. A similar condition in sheep, usually known as lambing sickness, is also well known. Several metabolic disturbances have been shown to be due to deficiency of trace elements. Grass tetany of cattle which is seen in different stages—the most acute showing tetanic spasm and coma—is due to magnesium deficiency and responds to the injection of magnesium sulphate. Pine, which is characterized by an ill-thriving condition both in cattle and sheep, arises essentially from cobalt deficiency, but other substances are often involved, notably iron. Treatment usually consists in providing salt licks containing the essential salts, but in at least one sheep area, where the condition has been troublesome, dressing the land with as little as two pounds of cobalt per acre, has given excellent results and the dressing need be repeated only every second year. Swayback in lambs is associated with copper deficiency; the condition is a progressive destruction of the white matter of the brain.

It is only in the last 15 to 20 years that research on sheep diseases in Britain has progressed sufficiently to provide an answer to many of the problems of disease prevention which have worried the sheep industry. Braxy was at one time a serious menace in many hill sheep farms but now vaccination has been found effective as a preventive. Lamb dysentery is a particularly troublesome disease, but as it usually appears among lambs where the same lambing shed is used year after year, a change to clean ground at lambing time frequently prevents further outbreaks. However, a serum is available and is very useful in controlling an outbreak provided lambs are inoculated before they are 12 hours old. Vaccination of ewes is practiced where early serum treatment of lambs cannot be carried out. Louping ill arises from infection with a neurotropic virus transmitted by a tick; methods have been advocated for tick control and in addition a useful vaccine has been elaborated. The disease is often associated with so-called tick borne fever, which is caused by a rickettsia. Further study is proceeding on this.

Strangles and equine influenza are still to be found in studs of horses, particularly in city stables. However, the most important disease of horses is grass sickness and, while losses from this disease on individual farms may be serious, the total losses from the condition throughout the country are not extensive. Prolonged research has excluded all possibilities of an infective agent as the cause of the condition, but has not solved the problem. Many authorities now believe that grass sickness is possibly a type of fatal colic and that the solution may be found in the field of dietetics.

To control mastitis, brucellosis, infertility and Johne's disease, an agreement of cooperation is signed by the farmer and his veterinarian

The Anatomy of the External Ear of the Dog

With Suggested Nomenclature for Heretofore Unnamed Structures

By
LOUISE A. SCHERGER
Minneapolis, Minnesota

THE purpose of writing this article is to give a collected and complete description of the external ear of the dog and to propose names for all unnamed structures.

Since some clients have asked the names of several different structures in the external ear of the dog, a search through the literature was made only to find that many of these parts have never been named.

The ears from 10 dogs were dissected and the ears of 50 living specimens were compared in order to attain an average.

The external ear (auris externa) is located on the posterior part of the dorso-lateral surface of the skull. Its function is to collect and conduct sound waves to the membrana tympani. The external ear is that part of the ear (organon auditus), which is exterior to the tympanic membrane.

The external ear varies greatly in size, shape and position in the various breeds. The auricle may be held in an erect position, as in the boston terrier, or pendulous, as in the cocker spaniel, or semi-erect, as in the fox terrier. In dogs with erect ears the concave surface of the external ear faces mostly anterior and slightly lateral. In semi-erect ears the concave surface is broken by the folding over of the ear, thus the concave surface of the tip of the ear faces the concave surface of the greater part of the ear. In pendulous ears the concave surface faces medially, lying against the dog's head and neck. In some breeds, as the irish setter, where the auricle is folded lengthwise (tip to base), the concave surfaces face each other.

The external ear consists of: (1) auricle or pinna; (2) external osseous meatus; (3) scutulum. When the cartilages of the ear are dissected out, they are three in number and are as follows: (1) auricular cartilage; (2) scutular cartilage; (3) annular cartilage.

The dog's ear will be described in the erect position; concave surface facing anterior.[1]

The auricula or pinna is funnel-shaped, with its large end projecting from the side of the head and its small end bent medially at an angle of about 110 degrees to attach to the osseous acoustic process.

The margin of the auricula corresponds to the *helix* of man's ear. There are usually two sides distinguishable on the large end of the funnel. They are called, according to position, *medial (anterior)* and *lateral (posterior) borders*. The medial border presents near its basal end a prominence, the *spine of the helix*. The spine divides into two branches, the *crus helicis mediale*, which runs into the interior of the auricle, and the *crus helicis laterale*, which continues the direction of the medial border ending in a pointed projection. In the dissected specimen this is a prominent squared projection separated from the lower cartilage of the acoustic meatus by the *incisura helicis laterale*.[2] The crus helicis laterale overlaps the *tragus* which, when the cartilage is dissected out, is an irregular four-cornered plate continuing over into the *antitragus*. The tragus forms the anterio-lateral boundary of the beginning of the cartilaginous meatus. The tragus is separated from the antitragus by the *incisura intertragica*. The antitragus is that part of auricular cartilage extending from the incisura intertragica and ending in a pointed process which is called the *processus uncinatus antitragus*.

The lateral border presents, just below its middle, a perpendicular pouch, the *helicine pouch*,[2] which is made up of a thin cartilaginous framework covered by skin. The inner sheet of the pouch is cut into deeply by a notch, the *interhelicine notch*[2] and just below this is a somewhat rounded projection, the *cauda helicis*.

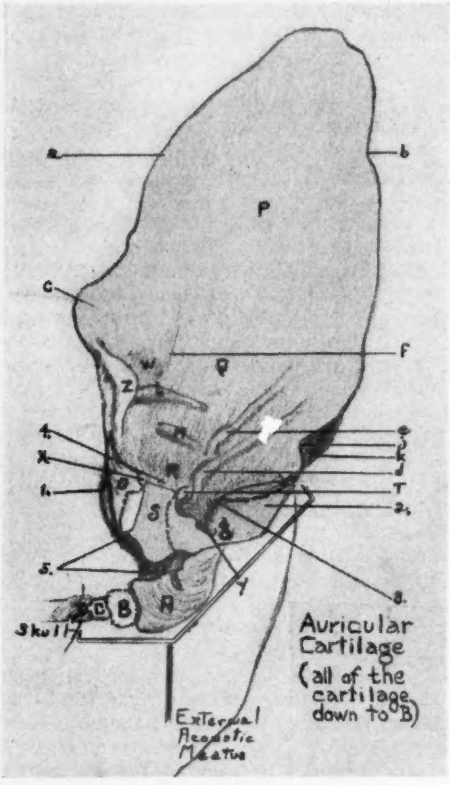
The processus uncinatus antitragus, when its cartilage is dissected out, is a pointed process and an extension laterally of the antitragus. This pointed process projects upward and overlaps the cauda helicis anteriorly. The incisure separating the cauda helicis from the processus uncinatus antitragus is the *antihelicine incisure*.[2] There is a skin fold over and parallel with the process of the antitragus which is called the *plica antitragica*.[3]

[1] In previous literature, the dog's ear was described as facing lateral, when actually the ear faces mostly anterior.

[2] Name suggested by the author.

[3] In some dogs this fold is absent.

CARTILAGINOUS FRAMEWORK OF THE EXTERNAL EAR OF THE DOG



a. medial (anterior) border
b. lateral (posterior) border
c. spine of helix
d. lateral longitudinal auricular ridge
e. intermediate longitudinal auricular ridge
f. medial longitudinal auricular ridge
g. antitragus
j. interhelicine notch
k. helicine pouch
l. superior antihelix
m. inferior antihelix
o. crus helicie laterale
p. auricular fossa
q. scapha, r. cavum concha, s. tragus
t. intertubal tubercle
v. cauda heli
w. cymba concha
x. intertubal notch
y. crus helicis mediale
1. incisura intertragica
2. processus uncinatus antitragus
3. antihelicine incisura
4. external acoustic orifice
5. intertubal fissure
A. Meatus auricularis } Cartilaginous part of
B. Annular cartilage } external acoustic meatus
C. Connectivum
D. External acoustic process (osseous acoustic meatus externi)

The concavity of the projecting large end of the funnel is called the *fossa auricularis*. There are two transverse cartilaginous ridges found in the lower part of the fossa auricularis. The uppermost one, which is the most prominent, is called the *superior antihelix*.[2] This ridge presents a prominent tubercle called the *antihelicine tubercle*.[2] The lower ridge, which has in previous literature been mentioned only as a skin fold,[4] is called the *inferior antihelix*.[2] The antihelicine tubercle is made prominent by an increased amount of connective tissue.

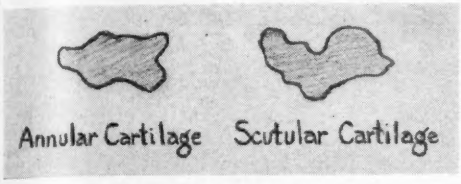
The superior antihelix divides the fossa auricularis into two parts, an upper part lying above the superior antihelix, which is comparable to the *scapha* of man's ear; and a lower part called the *cavum concha*, which lies below the superior antihelix and extends down to the beginning of the tubular part of the auricle. The recess above and between the superior antihelix and the medial crus of the helix corresponds to the *cymba concha* of man's ear.

There are several folds and tubercles lying in the auricular fossa. In the upper part of the fossa, above the superior antihelix, are two transverse creases, named according to location, *superior transient plica*[2] and *inferior transient plica*.[2] These disappear when the ear is stretched out.[5] There are three longitudinal (base to tip) folds which are named according to position in the auricular fossa, the *lateral, intermediate* and *medial longitudinal auricular ridges*.[2] These three ridges are composed of a cartilaginous ridge, connective tissue and skin. In the lower part of the auricular fossa are two transverse skin folds. The fold which lies between the superior and inferior antihelix is called the *superior transverse auricular plica*.[2] The fold which lies below the inferior antihelix is called the *inferior transverse auricular plica*.[2,6] Slightly below and alongside of the lateral longitudinal auricular ridge is a tubercle called the *intertubal tubercle*. It is made prominent by connective tissue and an elevation in the cartilage of the acoustic meatus.

The lower part of the auricle is rolled into a tube with its edges overlapping. The entrance into the tube is called the *external acoustic orifice*. The *external acoustic meatus* is the name given to the entire tube, both cartilaginous and osseous, extending from the external acoustic orifice to the tympanic membrane. The upper-most part of the car-

[4] The ears dissected by other authors either did not contain this cartilaginous ridge or else it was dissected out with the skin.
[5] These creases are found mostly in pendulous and semi-erect eared dogs and less frequently in erect eared dogs.
[6] This plica is found only in the larger breeds of dogs.

tilaginous acoustic meatus is formed by the antitragus, tragus, the overlapping of the crus helicis laterale and by the meatus auricularis, these being parts of the auricular cartilage. The intervening spaces are filled in by connective tissue. Further down, the meatus auricularis forms the entire part of the cartilaginous acoustic meatus. The *meatus auricularis*[2] is a basal extension of the auricular cartilage and is a rolled plate overlapping on itself in its lower half. The medial



bending in of the cartilaginous part of the external acoustic meatus occurs just opposite the lower-most border of the tragus.

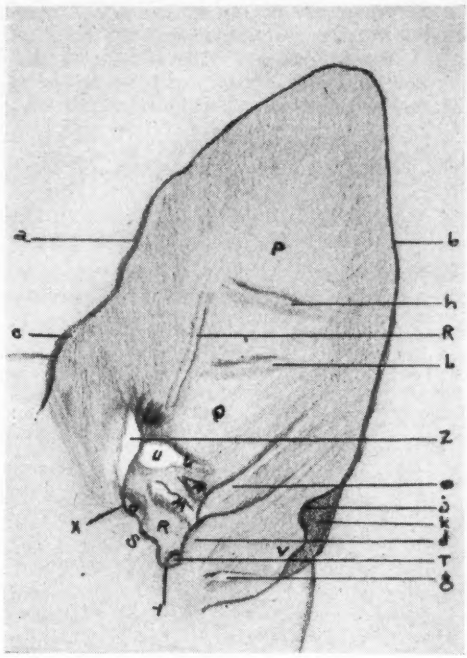
Between the basal border of the meatus auricularis and the osseous acoustic process is a separate sheet of cartilage, the *annular cartilage*. This cartilage is rolled and overlaps on itself to form the lower-most part of the cartilaginous acoustic meatus. The annular cartilage is attached to the osseous acoustic process or meatus by a ring of dense connective tissue called the *connectivum*. Half of the annular cartilage overlaps the basal part of the auricular cartilage and half is telescoped within the same cartilage.[7] The lateral end of the dense connective tissue ring is telescoped within the annular cartilage and the medial end attaches to the margin of the osseous acoustic process.

The *bony acoustic process* or *meatus* is a simple bony ring projecting approximately one-eighth inch superiorly and approximately one-fourth inch inferiorly, lateral from the *annulus tympanicus*, the bony rim to which the tympanum attaches. The process is lined with thin skin.

Upon dissecting out the cartilaginous part of the external acoustic meatus, a fissure is found extending from between the tragus and crus helicis laterale down through the annular cartilage, thus the auricular and annular cartilages can be laid open as a sheet. This fissure is called the *intertubal fissure*.[2] In the unskinned specimen this tubular portion is rolled and overlaps itself, and is held in position by connective tissue.

The posterior or convex surface of the projecting part of the ear presents elevations which correspond to the depressions on its anterior or concave surface and after which they are named. The convexity of the auricle, corresponding to the fossa auricularis, is called the *eminentia auricularis*. The eleva-

EXTERNAL EAR OF THE DOG (SHAVED SECTION)



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q. scapha
r. cavum concha
s. tragus
t. intertubal tubercle
u. antihelicine tubercle
v. cauda helicis
w. cymba concha
x. intertubal notch
y. incisura intertragica
z. medial crus helicus

tion corresponding to the cavum concha is called the *eminentia conchae*. The sulcus corresponding to the superior antihelix is called the *sulcus antihelicis transversus*.[2]

The third piece of cartilage making up the

[7] In some specimens the annular cartilage is entirely telescoped under the meatus auricularis.

external ear, the *scutular cartilage,* is a flat sheet of cartilage, roughly in the shape of a riding boot. It is intercalated in the temporal muscles and serves for the attachment of the deep auricular muscles. It lies on the temporal muscle, antero-medial to the auricle. The pointed projection or toe of the boot is directed toward the opposite eye; the back of the boot or the straight side is next to the auricular cartilage. Most of this cartilage is subcutaneous and can be palpated.

Acknowledgement

The author wishes to express her appreciation to Dr. Max McLeod for much valuable assistance, and to Dr. E. J. Frick and to Dr. R. E. Witter for many valuable suggestions.

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Didelphic Uterus

Persistence of the median walls of the ducts of Mueller to form double non-communicating uteri and cervices was observed in a registered Holstein cow from a purebred herd.

The following is the history of this case: Born 2-10-41; bred artificially 2-17-42; rebred artificially 10-22-42 and conceived; pregnant in left horn; calved 7-9-43; gestation period 280 days; live male calf weighing 95 pounds; placental membranes were physiologically expelled; cow's weight at this time was 1,020. Again bred artificially 10-5-43 and conceived; pregnant in left horn; calved 7-4-44 with a live male calf weighing 92 pounds; 273-day gestation period; placental membranes were again physiologically expelled; cow's weight at this date was 1,125; rebred 8-28-44. Veterinary assistance to date consisted of vaginitis treatment 1-8-43. All brucellosis agglutination tests have been negative and there is no history of inbreeding.

To get a clear picture of this condition a brief review of the embryological development is helpful. The beginning of the female genital track in the small embryo consists of two parallel rods, which later become excavated to form tubes—the ducts of Mueller—extending from near the posterior body opening upward and forward to the region of the ovary. Eventually the two ducts fuse at their posterior ends producing a single tube. The ducts become differentiated, through specialization in their development, into four essentially separate segments: The anterior segment or oviduct, the second segment or uterine cavity, the third segment consisting of cervix and the fourth or posterior segment —the vagina.[1] The second or uterine segments of the two Muellerian ducts constitute the two uterine cornua which normally communicate at their bases and have a common cervix. As the two caudal segments regularly fuse, their median walls disappear and a common tube results to constitute the cervix and vagina.[2]

Contrary to this normal line of development, upon vaginal examination of this particular cow, two cervical openings—cervices—into the anterior extremity of the vagina were found. By means of a rectal examination, further palpation of the genital tract revealed separate uterine cornua in close apposition at their posterior ends, continuing as two closely adhered cervices. It was concluded that each uterine horn empties through its own, individual cervix and does not communicate with the other until the fourth segment of vagina is reached. A more exacting examination of the cervices and uterus through the vagina has not presented itself since the cow has had a normal physiological parturition during both pregnancies.

Cases of double uterus observed by Fincher comparable to this, ended in disaster.[3] Information presented by Fincher and Williams proved that the female off-spring (presumably as a result of inbreeding) contained various defects in the development of the Muellerian ducts resulting in low fertility.[2] Apparently this report is an exception to the rule since fertility is normal in this animal.

With the increasing role of artificial insemination it is possible, if not probable, that many more cases similar to this one will be discovered, which otherwise would not be found. Regardless of the successful reproduction in such an abnormality, it must be remembered that the defect is embryological and heritable and that such cows should be discarded as producers of breeding stock.[1]

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Ft. Scott, Kans.

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Technics in Canine Euthanasia

By MAJOR ARTHUR H. BRYAN, V.C.
Mayo General Hospital
Galesburg, Illinois

ONE of the unpleasant duties of the practicing veterinarian and required of owners, is the humane destruction of senile, diseased, vicious, or stray pets.

Killing dogs has progressed from shooting, poisoning with strychnine or potassium cyanide and lay chloroforming, to more humane, more scientific and more professional methods. Cats and very small puppies are best destroyed by chloroform or ether inhalation in a lethal chamber.

*Cerebro-spinal Chloroform Euthanasia.***—Undoubtedly one of the most rapid technics requiring veterinary technical skill is the intracerebro - spinal - chloroform injection suggested by Captain Richard Gorman, V.C., AUS. By this method, to locate the site of the inoculation, the head is arched forward and downward thus widening the superior aspect of the atlanto-occipital articulation. Next a medium gauge needle is inserted at an angle, downward and backward into the joint, on the median line and immediately posterior to the occipital protuberance. This carries the injection in the region of the cisterna magna. When cerebro-spinal fluid flows through the needle, indicating the correct location, a syringe containing 5 to 10cc of chloroform is connected to the needle and the solution injected. The lethal effects are practically instantaneous with complete absence of pain, distress or fright.

Intravenous Chloroform.—Recently we have used a new technic known as "intravenous chloroform euthanasia", with uniformly excellent results, death occurring about as rapidly as in the other methods already enumerated. It has the additional advantage of the humane interpretation that the word "chloroform" has for the average layman.

Intravenous chloroform euthanasia is economical and practicable in all cases where the radial or saphenous vein can be injected and compares favorably with the other methods. The lethal intravenous dose of chloroform for small toy breeds is 5cc. Medium size dogs need up to 10cc and very large dogs may require as much as 15cc to produce immediate death. The method is definitely humane, satisfying the most exacting clients who may request to be present at the destruction of their pet. From a professional viewpoint, intravenous chloroform euthanasia has the advantage of requiring technical veterinary skill, and is superior to chloroform inhalations which cause considerable preliminary distress as the animal fights during the early excitable chloroform anaesthesia stages.

Intravenous and Intracardiac Methods.—Nembutal, given intravenously, is ideal for this method of destruction. Double the anaesthetic dosage, or approximately 2cc per five pounds of body weight, should be used. It has the disadvantage of being the most expensive lethal agent and may not always be on hand. A cheaper method utilizes 20cc of saturated solution of epsom salt intravenously in the radial vein, but it acts less rapidly than chloroform and requires two or three times the dosage which may be difficult to administer to small dogs. The same dosage and concentration of epsom salt may also be used directly into the heart with immediate lethal results.

CEREBRO-SPINAL ANESTHESIA
The animal should be in ventral or lateral recumbency. The most accessible site of injection is immediately behind the occiput—between it and the atlas

Electrocution.—Electrocution is a very simple and effective device for the humane destruction of dogs. The Modus operandi involves completing an electrical circuit through the animal. First the dog is placed in the standing position, preferably on a damp surface, with the site for the electrodes dampened. One storage battery clip is attached to the loose folds of the skin over the dorsal aspect of the shoulder or neck, and the other is attached to the skin above the dorsal sur-

**The point of entry of the needle into the central nervous system may conceivably be either intraventricular, intracisternal or intracranial.

face of the pelvis. The clips are connected to the electric light circuit by means of flexible insulated wires and a plug connection into the socket. When the current is quickly switched on and off two or three times the voluntary muscles will contract sharply with tonic spasms, and the subject is electrocuted instantaneously. The usual 110 volts in municipal areas or 220 volts in other areas is adequate for immediate electrocution. Electricians suggest that a step up transformer be included in the circuit for large animals, stepping up the voltage from 110 or 220 to 22,000 volts. However, in case of accident, this voltage is lethal to the operator and if used, careful precautionary protective measures are obviously indicated. From the veterinarians viewpoint the lethal effects of 110 volts properly applied is ample, for death is immediate in dogs of all ordinary sizes and breeds.

Electrocution Harness.—An electrocution harness, which can be made by any practitioner, combines restraint with lethal electrical fixtures. Two leather straps, four copper rivets, bolts and nuts, two copper strips, insulated wire, plug and switch are all that is needed. Two copper rivets are driven into the center of each strap about one and one-half or two inches apart and connected with a copper strip. The rivet ends must protrude inward, with the wire connections running to the switch and plug. The two straps with the copper rivet ends pressing on the dorsal skin, acting as the electrodes, are fitted one around the neck and the other as far back on the abdomen as possible. The feet and skin surface under both rivet ends are moistened with either water or saline solution and the dog is petted until quiet. The switch is thrown on and off a few times with immediate lethal results.

To protect the operator against vicious dogs, the animal may be restrained by looping a noose, resembling a horse twitch, around the dogs collar or neck, attached to a long stick or dry broom handle; otherwise the dog is held gently and released as the switch is thrown on. Rubber gloves may be worn for protection if floor of the room is damp. As an additional precaution the operator may stand on a rubber mat or dry board.

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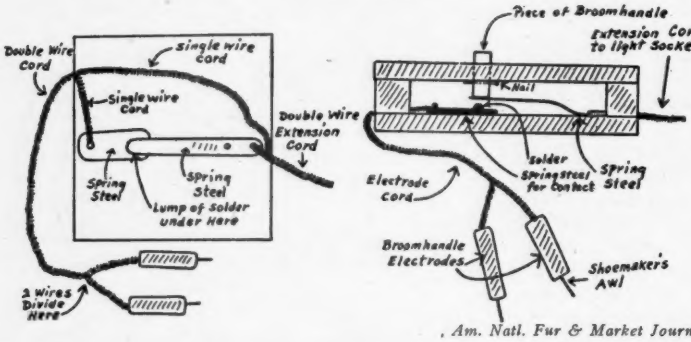

Diagram of construction of low cost apparatus for electrocuting dogs. At left is shown the method of wiring. The extension cord is plugged into an ordinary light socket, as shown; two pieces of spring steel are used to make the connection for the current. At right is pictured a side view of the machine when completed

, *Am. Natl. Fur & Market Journal*

Three Objectives of a Call

When a veterinarian is called to a case in a community that is new to him he has two objectives in mind, really three, although he may think little of the third.

First, he wants to handle the case to the very best of his ability.

Second, he wants to collect a fee for his services.

Third, he is desirous of so conducting himself as to make a lasting friend of his client and to impress favorably the neighbors who have gathered to see the new doctor perform.

It is curious how those three objectives are interwoven and failure to achieve any one of them nullifies any success achieved in the other two.

Practice that is handled indifferently is soon the practice of someone else.

If fees are not collected, and it becomes a habit, one puts himself out of practice and into some other vocation.

If one fails to make a good impression, particularly in a new neighborhood, he is not called there again and he might as well have failed to treat the case properly. Of course he can't collect fees for calls he doesn't get.

REMBRANDT MORGAN

Winfield, W. Va.

Sterile Thrombin in Operations for Conchal Hematoma

By O. G. DAVIDSON
Kalamazoo, Michigan

CONCHAL hematoma, which occurs rather commonly in the long-eared breeds of dogs, has in the past presented more or less of a problem post-operatively in regards to hemorrhage. These hematomas usually originate due to injuries or by severe shaking of the head, especially when parasitic otitis is a factor.

Conchal hematoma is characterized by rupture of the blood vessels and resulting hemorrhage between the perichondrium and the cartilage. This results in a round, tense swelling, uniformly fluctuating and accompanied by more or less pain and discomfort. The acute inflammatory symptoms subside after a few days but the collection of fluid remains.

After an operation for conchal hematoma the bandage may be similar to that used when ears have been trimmed

Recently our operative procedure of these cases has followed the technic outlined by Dr. H. W. Ayers. This consists of two linear incisions about one-half inch apart, the cavity is curetted thoroughly and then umbilical tape is passed through the two incisions and tied loosely. This method of operating results in less puckering and drawing and a better cosmetic end result. In the past we have found that considerable hemorrhage follows the incision and currettement of these hematomas, necessitating close observation and appropriate measures to control this hemorrhage for several hours or longer following the operation.

Recently we have been using a preparation of sterile thrombin,[1] which is prepared as a powder and when needed is dissolved in sterile water to make a solution of 200 Upjohn units per cc.

We have found that this strength of solution is successful in clothing even arterial hemorrhage in 15 seconds. A cotton swab saturated with sterile thrombin solution is introduced into the hematoma cavity and moderate pressure applied with the hand for about 15 seconds, all parts of the cavity are treated thus and it has been found that hemorrhage stops almost instantly and does not recur. In the cases which we have treated as above, we feel that healing of the cavity is hastened, usually complete healing occurs in a week to 10 days.

Sterile thrombin is derived from bovine sources and is a highly purified preparation. It is quite stable as long as it is kept dry and, when put in solution and applied to a bleeding surface, clotting takes place instantly and all bleeding stops. This preparation can only be applied locally. Injected into the blood stream it causes immediate death. However, no untoward reactions have occurred following its topical application.

We feel that the use of sterile thrombin solution in post-operative hemorrhage which occurs in the operation for conchal hematoma is very satisfactory in that all bleeding stops almost instantly and that healing is quite definitely hastened.

[1] Sterile Thrombin—Product of The Upjohn Company.

Clinical Reports

Quid Pro Quo

Twenty-seven years ago I was graduated from a veterinary college in a class of 31. With one exception I have not seen a word in print over the signature of any of my classmates in all those years. Twenty-nine are yet to give any account of themselves, to make any effort to help their fellow practitioners. You know there is a Biblical injunction about hiding one's light under a bushel.

I have been helped many times to do a better job by the published record of the experiences of others. The case reports in VETERINARY MEDICINE are always the most interesting part of the magazine to me. I seldom fail to profit by reading them. Nearly every year since graduation I have sent in for publication reports of a few cases from my practice, for no other reason than the thought that they may be helpful to some other practitioner. I leave readers to judge whether the attitude of my 29 silent classmates or my own is the correct one.

REMBRANDT MORGAN

Winfield, W. Va.

Cesarean Section for Schistosomus Reflexus

On July 10, 1944, a roan heifer eighteen months of age, suffering dystocia, was admitted to the clinic for delivery.

History.—The heifer had been in labor for 48 hours. Several unsuccessful attempts had been made to relieve her.

Treatment.—Vaginal examination revealed the fetus to be in a transverse position with three legs and the head in the birth canal. A guarded prognosis was given, but cesarean section was advised and, upon owner's consent, was performed.

A 16-gauge, two-inch needle was inserted between the last sacral and first coccygeal vertebrae and 40cc of a 2% solution of procaine hydrochloride was deposited extra-durally for anesthesia. The heifer was cast in lateral recumbency. An operative area was chosen on the right side of the median line and half way between it and the subcutaneous abdominal vein. An area 10 inches wide was shaved from the udder forward as far as the umbilicus. The skin was cleansed thoroughly with carbon tetrachloride and then cotton saturated with a 1 to 1000 solution of bichloride of mercury in alcohol was applied.

A skin incision approximately 12 inches long was made half way between the median line and the subcutaneous abdominal vein. The posterior portion of the body was rotated to bring it into dorsal recumbency. The abdomen was covered with a sterile linen sheet, through which an incision was made to correspond to the skin incision. The operator, wearing sterile rubber gloves and observing strict asepsis, incised the aponeurosis of the oblique abdominal muscles and the peritoneum corresponding to the skin incision.

The abdominal cavity being opened, the omentum was grasped at its posterior edge and pulled forward, thus exposing the uterus. The pregnant horn was located and brought

through the incision and then the posterior portion of the cow was returned to lateral recumbency. An incision was made through the wall of the uterus observing the location of the cotyledons so as to avoid injuring them. A fetal hook was placed in the pelvic girdle of the fetus which proved to be a monster (schistosomus reflexus, see illustration) and by traction it was removed. The placenta was removed and two one-ounce capsules of sulfanilamide were placed in the uterus.

The incision in the uterus was closed with two rows of continuous Lembert sutures using No. 1, 20-day chromic catgut. The incision in the aponeurosis and peritoneum was closed with one continuous suture of umbilical tape and the skin incision with mattress sutures of umbilical tape.

Immediately after the operation 500cc of

a 25% solution of dextrose was administered intravenously and, 24 hours after the operation, 10cc of posterior pituitary extract was injected epidurally. The uterus contracted to normal size and two more one-ounce capsules of sulfanilamide were placed in it.

The heifer made an uneventful recovery and was released from treatment 10 days after the operation.

JOHN B. HEALY

Junction City, Kans.

Trichophytosis in the Horse

Definition.—Trichophytosis (herpes ringworm, tinea) is a contagious disease of the skin, caused by a fungus (Trichophyton spp.) and sometimes characterized by more or less roundish, sharply defined spots in the sphere of which the skin at times is covered with vesicles, but generally with scabs or scales, and appear either naked or covered by short hair stumps.

History.—September 10, 1944, a two-year-old, skewbald filly weighing 1200 pounds and in good condition, was presented for treatment of a wire cut on the right front carpal joint. The filly had been on pasture and the owner thought the injury had occurred the previous day. He had not noticed the condition of the skin.

Symptoms.—With the exception of the head and neck, the lesions were fairly well distributed over the body, including the sides of the chest, shoulders, along the back, on the croup and down to the fetlocks on both hind legs. The lesions were dry, scabby, irregular, circumscribed areas measuring 4 to 5cm in diameter and showing the characteristic elevated, denuded areas, especially in the center of the lesion.

Diagnosis.—A diagnosis trichophytosis was verified by demonstrating with the microscope the filaments (hyphae) and the spores (conidia) from the skin lesion.

Treatment.—After the areas were thoroughly washed with soap and water and dried with absorbent cotton, to remove any accumulation of exudate and seborrhea, daily applications of tincture of iodine were applied to the lesions with favorable results. Iodine compounds are specific for this type of skin infection and usually bring about a rapid recovery.

Discussion.—Although trichophytosis in the horse is not a rarity, it is encountered much less frequently than a similar condition in cattle; but more often than in dogs or cats. Due to its rapid spread, both on the body and from animal to animal, it cannot be ignored as an economical livestock problem. Herpes must also be considered as a disease transmissible from animals to man, not only as a primary infection, but also as affording an excellent entrance into the body of secondary invaders, such as streptococci, staphylococci and organisms of similar ubiquity. A disease of this type denudes the body of part of its most effective defense against pathogenic organisms, namely the epidermis, and thus conduces to secondary infections.

Various types of ringworm are recognized, but, in general, all show the same characteristic, ring-like lesions and are treated alike. The species of Trichophyton found in the horse, the dog and the cat are most readily transmitted to man through actual contact in the handling of the animals.

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Dirofilariasis with Paraplegia and Its Treatment

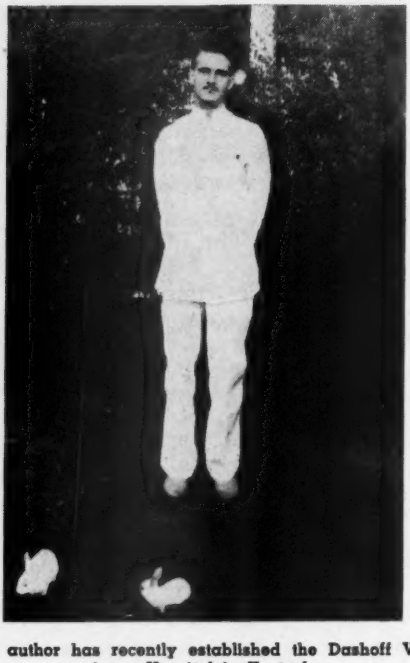
It is known, but sometimes not given sufficient consideration, that most diseases of animals vary in prevalence in different sections of our country. The symptoms and lesions also vary in different geographical areas. Finally, pathological conditions within the animal sometimes vary from year to year. It is important to remember these variations. Heartworm in dogs, for example, is rare in California, Massachusetts and Rhode Island but is prevalent in most of the other states. It is the most common disease associated with posterior paralysis in dogs in the mid-west. If such is the case elsewhere it has not been reported.

During the past nine months we have been doing considerable routine blood examination on dogs and have been surprised to find heartworm infection so common in this area. Of nearly 75 cases in which microfilaria were demonstrated in the blood there were 13 of posterior paralysis—all in aged dogs. Necropsies were held on three of these cases, including one case of paraplegia, and dirofilaria were found in the pulmonary artery in each of them.

Of a total of 16 cases of paraplegia that we have treated in the past nine months, 13, as stated, revealed microfilaria in the blood stream. Whether dirofilariasis is the disease most frequently associated with paraplegia elsewhere we do not know. However, our experience is that such is the case in the St.

Louis area. These cases ranged from recent infection to some of two year's standing and included animals that had been treated with calcium, vitamins, hormones, arsenic, massage, etc., without benefit.

When a diagnosis of heartworm was confirmed the animal was given arsenic and antimony and a decided improvement was noted within a week. Some of the dogs began to use the hind legs slightly within three days and only one required treatment for six weeks before showing signs of returning muscular control. One case of paraplegia died under treatment; the other 12 all recovered. Only one (in addition to the one that died) exhibited a severe reaction to the medication. That one manifested symptoms of shock five minutes after receiving an injection of antimony but responded nicely to an injection of epinephrine.



The author has recently established the Dashoff Veterinary Hospital in Kentucky

Treatment of aged dogs should be administered with care and each case watched closely. It must not be pushed; that is dangerous. One old dog, not a case of paraplegia but lame in one hind leg, required continuous treatment for six months before the microfilaria all disappeared from the blood stream. The seriousness of the case should be fully explained to the owner and he should be told that the treatment will require at least several weeks and, possibly, several months. Arsenic and antimony used on alternate days gave better results than antimony alone used every other day. The preparation of arsenic used was sodium cacodylate; of antimony, fuadin. The cacodylate is given subcutaneously and the fuadin intravenously.

A convenient method of obtaining blood for examination for microfilaria is to prick the tip of the dog's nose with a Hagedorn needle and catch three large drops on a microscope slide; cover with another slide and examine. Search should be continued for at least five minutes before a negative report is decided upon. For those who prefer to have the examination made by a laboratory the blood may be collected conveniently from the radial vein. Place a tourniquet about the elbow region, clip the hair over the radial vein, swab the skin with ether and insert a 22-gauge, ¾-inch needle into the vein from a lateral approach. Insert it *calmly*, collect the blood in a small test tube and remove the tourniquet. Allow the blood to stand at room temperature until coagulation occurs, then collect a few drops of clear serum for examination. In positive samples there is a great concentration of microfilaria in this serum. Hundreds of them can be seen wriggling and dashing about in a single microscopic field. This method should be resorted to in all clinically suspicious cases, if examination of the whole blood fails to reveal the parasites.

Since we are interested in how widespread this association of dirofilariasis and paraplegia is, I hope other practitioners who have observed this association or either condition in old dogs will write of their experience to VETERINARY MEDICINE. It will help all of us.

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Little Pig Vaccination

During the drouth of 1926 many pigs were imported into the territory near Manly and a considerable number of them developed what has since been termed "South Dakota scours." The losses in these pigs and in herds to which they were introduced was heavy.

In 1927 I began having herds of pigs get sick with scours or "necro" between six and 14 days after having been treated with anti-hog cholera serum and virus for immunization purposes. This was the first experience I had ever had with sick pigs following vaccination and it caused me much concern. The number of herds thus affected increased as the season advanced until it was more or less alarming.

I felt the products I was using were as good as I could get, and I knew my work was as good as I had ever done.

One farmer living west of Manly had an outbreak of hog cholera in his herd and called me to treat them. He had one sow with a fine litter of pigs, just under three weeks of age, that had been kept away from the herd and were apparently quite healthy at the time of treatment of the herd. He asked me to give the little pigs serum and virus as I had given the older pigs in the herd. I told him I did not like to give pigs as young as these were the virus for I believed they might come down later with cholera from exposure to his infected lots. However, he insisted and I treated them giving the pigs one cubic centimeter of anti-hog cholera serum and three of virus per pound body weight. I warned him not to keep any of this litter of pigs for breeding the next year. We marked them so they could be identified easily. When it came time to immunize his spring pigs in 1928 I was surprised to find a few sows that had the mark of the little pigs which, when three weeks of age, had been treated the year before. Questioning the owner concerning these pigs he said "these sows were the best gilts I had last fall and I kept them and they have remained well and farrowed these fine pigs this spring." I warned him they might get sick with cholera if they were permitted to run with the pigs I was then treating with anti-hog cholera serum and virus. He said he was willing to take that chance with these sows. They remained well at all times although running with pigs that had just received serum and virus.

This experience gave me the idea that perhaps I might render a greater service to many farmer clients if I treated some pigs at three weeks of age. I started the program cautiously but the more I watched the little pigs treated the better I liked the method. I could give them 1cc per pound body weight, and 3cc of virus and the cost to the owner was much less than for pigs treated after weaning. Neither did these three-week-old pigs show as much reaction as did the older pigs. From close observation I also noted that scarcely, if ever, did any of the pigs treated at three weeks of age develop any "necro" or other intestinal troubles later in life. They seemed to "take" the vaccination much better, stand up against the reaction period much better, and showed no tendency to stunt or otherwise give the owner any trouble. The three-week-old pigs showed practically no shock whatever when treated. The owners soon observed the more favorable results of little pig vaccination and were pleased with the lessened cost of treatment. They began asking for more of this type of vaccination.

I treated about 4000 pigs at approximately three weeks of age in 1928 and have steadily increased the number each succeeding year. For 10 years or more I have treated 10,000 to 12,000 pigs each year at about three weeks of age. I feel the results have proved this to be a distinct service to my clients.

During the entire 15 years or more I have practiced this system of treating little pigs with serum and virus I have never had to retreat any gilts held over for breeding purposes, nor has there ever been a single sow break with cholera after her pigs received the serum and virus the next spring or summer. Many sows have farrowed as many as four litters and have run with their pigs after vaccination with serum and virus and have not, at any time, showed any indications of not being immune.

I administer both the serum and the virus intraperitoneally, the serum on one side and the virus on the opposite side of the abdomen. I know this will be criticized but it has worked successfully in my practice and I have no reason for making a change.

There are many clients in my territory that won't have any other method of vaccination for their pigs and many of them have been using this method for 10 years or longer.

The little pig vaccination has increased the demand for vaccination of pigs in my territory, it has reduced the cost of treating the pigs materially for the owners, the post-vaccination troubles are no longer present with any of these clients, the pigs have done much better and we all, the farmers and myself, feel the system has much merit and we shall continue it. It has lessened the amount of serum used on these herds, but has increased considerably the amount of virus required for them.

A client, who lives on a farm that was so badly infected that no pigs could be raised, has just come into my office. For a time he ceased to raise pigs and bought older pigs to feed and got by that way. But two years ago he tried again and had farrowed a bunch of pigs on this same farm. At three weeks of age I treated them. They did well and he has raised both spring and fall litters each the past two years. This owner says he wouldn't try any other system. That it is so much easier and seems to prevent all post-vaccination troubles and has made it possible for him to raise his own pigs.

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Abstracts

Treatment of Anthrax with Penicillin

Anthrax is still an important medical problem among workers in the wool and leather industries, notwithstanding that prophylactic measures adopted in those industries have materially lowered the incidence of the disease.

Prior to 1932 the mortality from anthrax in man was 26%, but by 1942 it was reduced to 13% by the use of neoarsphenamine alone or in combination with antianthrax serum.

The authors[27] report the treatment of three cases of anthrax with penicillin. The clinical response to the treatment was rapid and definite. The progress of the disease was reversed within 12 hours and recovery was prompt in all the cases. These are believed to be the first cases of anthrax in persons treated with penicillin as its successful use in mice infected with anthrax was first announced in October by Doctors Heilman and Herrell of the Mayo Clinic.

Diagnosis of Parasitism

The author[37] found phenothiazine to be practically 100% effective against *Haemonchus contortus*, including the immature worms, in sheep. He classifies helminths in the order of decreasing susceptibility to phenothiazine: Ostertagia spp. and *Trichostrongylus axei;* Cooperia, the other Trichostrongylus spp., and Bunostomum; *Chabertia ovina* and *Oesophagostomum venulosum;* Strongyloides and *Trichuris;* Nematodirus and Moniezia.

To obtain a quantitative estimation of the degree of infection "eggs per gram" (EPG) is the most widely used standard to express the result of a fecal count. Live fecal culture can be made by placing some feces in a glass jar, adding a little water if the feces are very dry, and placing in a dim light at room temperature in summer or incubated at about 25° C. in winter.

Coccidia oocysts in the feces are easily detected by a fecal suspension prepared in sodium hydroxide. Skin scrapings from suspected mange lesions may be examined by boiling the material in 10% potassium hydroxide for a few minutes until the hairs and debris are broken up. This residue is then centrifuged and the supernatant fluid decanted off, when the sediment may be examined microscopically. Flotation fluid may be added after decanting, when on centrifuging the mites will float to the surface. If only a few hairs and debris are present the material can be cleared in creosote or clove oil and examined directly.—*A. H. Bryan.*

Natural Occurrence of Tularemia in Dogs

The use of live virus vaccine for the immunization of animals requires special care to avoid spreading, accidentally, other diseases derived from animals used as a source of virus. Familiar examples of such accidents are the contamination of smallpox vaccine with the virus of foot-and-mouth disease; the contamination of hog cholera virus with the viruses of foot-and-mouth disease and vesicular stomatitis and with *Erysipelothrix rhusiopathiae;* and the contamination of canine distemper vaccine with the virus of lymphocytic choriomeningitis. Great care is exercised at the present time to prevent a recurrence of any of the foregoing. In the author's[24] opinion special precautions should be observed to prevent the spread of tularemia by antidistemper tissue vaccine derived from animals infected with the *Pasteurella tularensis.*

Dogs and ferrets readily develop a systemic infection where inoculated intradermally, subcutaneously, intramuscularly, intranasally or intracerebrally with a suspension of tissue infected by *P. tularensis* or when such tissue is ingested. Insofar as they were tested, ferrets are equally susceptible to the infection. Clinically, tularemia so closely resembles distemper in both animals that the disease readily might go unrecognized, i.e., might be diagnosed as distemper and the vaccine blamed for causing it.

The history of Johnson's case is: Twenty-five puppies were collected from an area in which tularemia is endemic in wild rabbits, for the commercial manufacture of canine distemper vaccine. They were inoculated with a suspension of spleen tissue from a previous passage of canine distemper virus. The spleens were pooled and a ferret inoculated with a tissue suspension from the pool was sent to the author. It developed what appeared to be an ordinary attack of distemper but on postmortem examination pin-point necrotic areas were discovered on the liver. With considerable difficulty these were determined to be due to *P. tularensis.*

A number of experiments were made with the organism thus isolated. Intracerebral inoculation in dogs was 100% fatal. Inoculation

[27] Murphy, F. D., La Boccetta, A. C., and Lockwood, J. S. Treatment of human authrax with penicillin. *J. Am. Med. Assn.*, 126:15, pp. 948-950, 1944.

[37] Bingham, M. L. Some clinical diagnostic methods of use in conditions associated with animal parasites. *Vet. Rec.*, 56:35, pp. 313 to 316, 1944.

[24] Johnson, Harald N. Natural occurrence of tularemia in dogs used as a source of canine distemper virus. *J. of Lab. and Clin. Med.* 29:9, p. 906-915, 1944.

by other routes gave rise to a systemic infection—the organism showing a special affinity for the upper respiratory tract. The organism persisted for as long as 25 days in the nasopharynx of dogs infected intranasally. Except from intracerebral inoculation, dogs usually recover from attacks of tularemia.

Smallpox Yields to Penicillin

A report[20] of successful treatment of smallpox by penicillin is made. Four patients, of 37 patients admitted to a hospital in Italy in 1943, were critically ill and near death. These four were given 15,000 units of sodium penicillin intramuscularly every three hours for three or four days. Three recovered and there was pronounced improvement within 24 hours. The quick drying of the pustules and the subsequent minimal pock marking was striking. The fatal case was one of confluent smallpox.

Streptothricin as a Chemotherapeutic Agent

In tests with crude streptothricin Robinson and Smith[3] found it possesses great activity against a variety of gram negative bacterial species. Gram positive forms are sensitive to action of the drug but not to the same degree as the gram negative forms. Streptothricin is more active when given parenterally than when administered by mouth. Results of the tests indicated the drug is not active against *Trypanosoma equiperdum*, but that it may be useful in local infected wounds and burns as well as food poisoning caused by the Salmonella organisms.

Rabies in New Orleans

Doctors Palik and Moss[25] present an analysis of 12,237 patients admitted to the Pasteur Institute Clinic in New Orleans and of 3,003 animal brains submitted for examination and diagnosis during the period from Jan. 1, 1934, to Oct. 31, 1943, inclusive. The Pasteur treatment was given to 4,146 patients. Of 3,003 animal brains submitted for examination 1,003, or 43.3% , were positive for rabies. Stray dogs, which were unavailable for examination, were responsible for exposure to rabies in 45% of the patients treated. New Orleans experienced an epidemic of rabies beginning in the latter part of 1936 and continuing until the latter part of 1939. The present epidemic began early in 1943 and has shown a higher human mortality than the previous epidemic. Dogs were responsible for the exposure of 90% of the patients treated and for all of the seven deaths from rabies. Injuries about the face, head or neck are more dangerous than are injuries to other parts of the body. Injuries through clothing are less dangerous than injuries inflicted through the bare skin. The mortality from rabies is greater in Negroes than in white patients. Mortality from delay in instituting treatment is not significantly increased until two weeks after the injury. Rabies can be controlled by controlling the dog population.—Abst. from *J. Am. Med. Ass'n.*, 126:15, p. 984, 1944.

Nutritive Value of Dehydrated Meat

Pork and beef when dehydrated[18] retain 60-70% thiamine, 90-100% riboflavin, 90-100% niacin, and 70-80% pantothenic acid. Cured pork when canned retains 67% thiamine, 90% riboflavin, 94% niacin, and 76% pantothenic acid. Little or no loss in niacin, riboflavin and pantothenic acid occurs in canned pork, dehydrated pork, or dehydrated beef stored at 99° F. At higher temperature slow destruction occurs.

Vitamin K Fortified Blood for Transfusion

One great problem in the control of hemorrhage is that associated with severe damage to the liver. It is known[22] that severe hepatic injury is invariably associated with a deficiency of prothrombin in the circulating blood. When the hepatic injury is severe enough, the administration of vitamin K is not effective in correcting the deficiency of prothrombin. It is believed that disease of the liver interferes with response of the prothrombin level to vitamin K therapy. Transfusion of blood fortified by the administration of vitamin K to the donors was used as a temporary aid in controlling hemorrhage in four cases of severe acute damage to the liver. The results obtained from this method of treatment indicate that the method may have definite value in preventing death from immediate hemorrhage or in control of hemorrhage until the regeneration of sufficient hepatic tissue for essential functions.

[20] Jeans, W. D., Jeffrey, J. S. and Gunders, K. Penicillin and smallpox; a report of four cases. *Lancet* (London) 2, p. 44, 1944.

[3] *J. Phar. & Exp. Therap.*, 8, p. 391 (Aug.), 1944.

[25] Palik, E. E., and Moss, Emma S. Ten-year survey of Pasteur Institute of Charity Hospital of Louisiana at New Orleans. *N. O. Med. and Surg. J.*, 97, p. 153, 1944.

[18] Rice, E. E., and Robinson, H. E. The nutritive value of canned and dehydrated meat and meat products. *Am. J. Pub. Hlth.*, 34, pp. 587-592, 1944. Abst. from *Med. J. Facts*, 5:1, p. 24, 1944.

[22] Kinsey, R. E. Transfusions with vitamin K fortified blood to control hemorrhage. *Arch. Int. Med.*, 73, p. 131, 1944. Abst. from *What's New*.

Prevalence of Brucellosis in Man

Staub[26] thinks that 10% of the population have brucellosis but that only one case in a hundred is correctly diagnosed. Improved state and federal laws are necessary in the control, marketing and distribution of dairy products. A closer cooperation between the medical and veterinary professions is urged. The sulfonamides are almost without value in the treatment of brucellosis. Penicillin shows only mild laboratory success. Antiserum is usually limited to acute, severe attacks or acerbations. Vaccine therapy seems most promising in the treatment of acute and chronic Brucella infections. Fever therapy is more beneficial in acute than in chronic cases, especially in refractory cases not responding to vaccine therapy.

Effect of Cod Liver Oil on Different Breeds of Dairy Calves

Roughly one-half of the 72 calves born in the Guernsey, Holstein, and Jersey herds at University Farm, Minn., in a 3-yr. period were fed about 25-35cc of cod-liver oil per head daily in addition to milk and grain.[32] Weights were determined at 10-day intervals, and height of withers was ascertained every 30 days. Adding cod-liver oil had no evident effect on the rate of gain in height at withers of calves of these breeds or in gain in weight of Holsteins. On the other hand, the Guernsey and Jersey calves fed cod-liver oil gained 22.5 and 17.5 lb., respectively, more per calf during the 180-day period than calves receiving no cod-liver oil. Somewhat less digestive troubles were noted in the calves fed cod-liver oil than in the nonsupplemented groups.

Bovine Tuberculosis Due to Udder Irrigation

The authors[33] present evidence showing that udder irrigation can be responsible for the introduction of tubercle bacilli with the subsequent development of tuberculous mastitis. The infection occurred in each of seven irrigated quarters of six cows in a single herd and in each of 14 additional quarters in the same herd, irrigated with the same apparatus and on the same day. Every animal in contact with those irrigated developed tuberculosis as indicated by the tuberculin test. Thus the cows were not only infected by the udder injections but became active spreaders also. The ease of infection of the bovine mammary gland with *M. tuberculosis* is pointed out, concomitant with the great danger of mammary tuberculosis following "in contacts."—*A. H. Bryan.*

Vitamin B and Work

The Laboratory of Physical Hygiene of the University of Minnesota[23] has specialized in the application and evaluation of tests of human physical capacity and function. They found that there is no close relation between the blood sugar level and exhaustion or the capacity for work under ordinary conditions; that sugars are excellent fuels for immediate use in muscular work and restorative action in fatigue; that protein intake above normal minimal requirements is unimportant in the performance of physical work; that pure fat is about 10% less effective as a fuel than pure carbohydrate, and the use of a high fat diet appears to result in lessened endurance when continuous hard work is undertaken subsequently; that if there is any benefit at all to be derived from an increased phosphate intake it must be small; and that vitamin B complex factors are closely related to carbohydrate metabolic processes which are fundamental to the performance of physical work.

Sulfonamides in Avian Malaria

In studies[30] as to the antimalarial properties of certain sulfonamides for fowl, sulfadiazine was administered to two series of chicks at a dosage of 1.0 milligram per gram of body weight twice daily for eight days, and to one series at a dosage of 0.5 milligram per gram for 4 days, beginning just prior to bites by *A. aegypti* mosquitoes infected with *P. gallinaceum*. None of the treated birds developed malaria. Sulfaguanidine was given according to the same plan; 2 of 20 birds receiving the higher dosage and 5 of 12 birds receiving the lower dosage became infected. Of the 34 control birds, 27 developed typical infections.

These data lead us to believe that sulfadiazine has decided prophylactic action against mosquito-borne *P. gallinaceum* infection in the chick; sulfaguanidine at the same oral dosage is considerably less effective.

[26] Staub, R. R. Brucellosis—an unrecognized menace. *Northwest Med.*, 43, p. 274, 1944.

[32] Gullickson, T. W., and Fitch, J. B. Effect of adding cod liver oil to the rations of dairy cows. *J. Dairy Sci.*, 27:5, pp. 331-335, 1944. *Abst. in Expt. Sta. Rec.*

[33] McFarland, D., Garside, J. S., Watts, P. S., et al. An outbreak of bovine tuberculosis due to udder irrigation. *Vet. Rec.*, 56:41, pp. 369 to 371, 1944.

[23] Keys, A. Effect of vitamin B on Physical Performance. *Minnesota Med. Found.* 4, p. 14, 1943. Abst. from *What's New.*

[30] Coatney, Robert G., Senior Malariologist, and Cooper, W. Clark, Passed Assistant Surgeon, U. S. Public Health Service. The prophylactic effect of sulfadiazine and sulfaguanidine against mosquito-borne *Plasmodium gallinaceum* infection in the domestic fowl. *Pub. Hlth. Repts.*, 59:45, pp. 1455-8.

Book Reviews

The Horse America Made. The story and analysis of the world's greatest saddle horse; and a simple explicit guide for training, riding and rearing. By *Louis Taylor*. 243 pages, 50 illustrations. Published by the American Saddle Horse Breeders Association, 1944. Price $3.50.

"The horse America made" is of course the American Saddle Horse, whose development began far back in colonial times and had taken character, form and homogeneity a hundred years ago. Since then, according to Taylor, he has not been approached by equine kind in intelligence, docility, endurance, appearance, versatility or usefulness. Superb for the carriage, matchless under the saddle, top flight in the hunt and unbeatable in the show ring, he is a thing of beauty, utility and a pleasure always.

This work was planned and commenced in 1941 but the war interfered with its production, both delaying and abbreviating it; otherwise the panegyrics must have been positively scintillating. But hyperbole aside, it is an excellent work, packed with interesting facts and sound advice.

The discussion encompasses briefly (there are but 180 pages of text) type and history, shows, work, sports and play, tall stories, hints on care and use and blood lines.

The importance of professional veterinary care is stressed. "If the horse slobbers, hold his head to one side or evinces other difficulty in eating have a veterinarian look at his teeth." "If a horse does not respond properly to good feeding and care, he may be wormy, call a veterinarian." "Don't take the advice of any layman or rely too much on your own judgment in the matter of ailments of your horse, major or minor. If the horse is worth feeding, he is worth a veterinarian; if not, turn him out" and "just as promptness in obtaining a physician is important in the treatment of man, so prompt calling of a veterinarian is important in the treatment of a horse" are samples of the advice given. Having made such a good beginning the author then cannot refrain from telling, in three pages, what he knows of equine pathology, which is redeemed only by—"The foregoing treatment is not offered as a substitute for a veterinarian's care but as a useful aid to those who find the services of a veterinarian difficult to procure."

Perhaps a criticism on the ground of the high price of the book is justified. Presumably the object of publication is to disseminate as widely as possible information of the American Saddle Horse. Notwithstanding the binding is an artistic one, the paper heavily coated and it contains 50 expensive halftones the price could be lower without loss and distribution greater, with less effort.

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Air-Borne Infection. By *Dwight O'Hara* M.D., Professor of Preventive Medicine, Tufts College Medical School; Visiting Physician, Boston City Hospital; Physician-in-Chief, Waltham Hospital. 114 pages, 11 charts. Published by The Commonwealth Fund, New York, 1943. Price $1.50.

This is an interesting discussion and an unusual one. While the subjects discussed are strictly medical most of them have analogies in veterinary medicine to which the author's theories may be applied. The stated purpose of the work is to prevent the development of "a fabulous story" about the decline in respiratory disease "analogous to those which have been told about so many of the achievements of mankind—a story designed to exalt the virtues and cover the weaknesses, to emphasize the obvious and ignore the obscure, until the subjects dealt with become in retrospect simple pleasant tales of a past that is dead and beyond recall."

The scope of the work is somewhat wider than the title indicates since diseases not ordinarily regarded as principally air-borne receive consideration. It is the author's belief that the striking reduction in the incidents of air-borne infections that has occurred is due only in minor part to preventive medicine. "Even smallpox became a mild disease before we really got down to the business of eradication. If these sequences can be kept in mind it will be plain that preventive medicine has enjoyed, over the years, the company of a silent partner. Its identity is not well established, nor do we know its other benefactions or all its ramifications, but that it has been there at work in a great variety of capacities to help in the prevention and amelioration of respiratory infection is unquestioned."

And of the achievements of man in the field of disease prevention by no means all nor the most important was contributed by the medical profession. Engineers purified our drinking water and gave us modern plumbing; architects and carpenters provided better housing; agriculture and other sciences and arts improved our nutrition and improved culture brought about personal cleanliness and hygiene for reasons quite aside from their value in the prevention of disease. Only in the slums of today, do the habits and habitations of the commonality of yesteryear prevail, and it is these slums that constitute reservoirs of air-borne infections of today.

The importance of a partnership between

bacteria and viruses and of combinations of bacteria in producing infections and epidemics is stressed.

Seldom has any author in the field of medical science put as much thought provoking material into 100 pages.

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El "Trypanosoma Vivax" Americano. Agente de la Trypanosomiasis Bovina en Venezuela su Comparacion con el del Africa (Text in Spanish with summary in English). By *Vladimir Kubes,* D.M.V., Director of the Institute of Veterinary Research (Caracas) Venezuela. Paper bound, 124 pages, illustrated. Published by the Minister of Agriculture, Caracas, 1944.

The author, a graduate of the University of Brno, has been a frequent contributor to the literature of veterinary medicine in his native country of Czechoslovakia and in Ecuador and since 1934 in Venezuela. The present report is based upon a 10-year period of observation and study of both experimental and field cases of trypanosomiasis and the *T. vivax* as they occur in Venezuela. It includes also a review of the literature of the disease in other South American and in Central American countries and in Africa. The conclusion is reached that the *T. vivax* in the Western Hemisphere is not different from the African strain of the organism.

Any book reviewed in these pages, or any other book if available, may be obtained by remitting the published price to VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago 49. Bulletins and Circulars should be requested direct from the address given in the notice. Generally they are supplied free unless a price is stated.

The outstanding symptoms of bovine trypanosomiasis is slow, progressive loss of condition with edema under the maxillae, the thorax and the abdomen shortly before death, which usually occurs two to four months after the onset of the disease. If the animal lives more than four months it usually recovers, the trypanosomes disappearing from the peripheral circulation within from 10 to 18 months. Well fed and well cared for cattle nearly always recover after about two months. Cattle on poor pastures suffer a heavy mortality and in severely parasitized animals the death loss is very heavy.

The response of bovine trypanosomiasis to chemotherapy obtained by the author parallels the results obtained in Africa—arsenic and amidines are ineffective, antimony derivatives are effective. The one of choice is "antimosan." However, it is too expensive for general use. The author discovered that Bayer "7602," a quinoline compound not previously used in the treatment of trypanosomiasis, is in several respects superior to any treatment so far used and he believes this discovery will mean much in the future control of the disease.

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Useful Bulletins, Circulars, Etc.

Hog Cholera. Cir. 578, Illinois Agr. Exp. Sta., Urbana.

Wartime Beef Production. Bul. 501, Illinois Agr. Exp. Sta., Urbana.

A Technique for the Sex Determination of Chicks. Miscellaneous Report 3, Minnesota Agr. Exp. Sta., University Farm, St. Paul 8.

Fish for Food from Farm Ponds; Bul. 1938 (revised with many changes), U. S. Dept. Agr., Washington 25, D. C.

Proteins for Livestock and Poultry. Cir. 286, Missouri Agr. Exp. Sta., Columbia.

Minerals for Farm Animals. Cir. 153, Oregon Agr. Exp. Sta., Corvallis.

Effect of Feeding Silages on Certain Properties of Milk. Bul. 710, New Jersey Agr. Exp. Sta., New Brunswick.

Screw-worms in Florida. Bul. 125, Florida Agr. Exp. Sta., Gainsville.

Watering Equipment for Poultry. Cir. 119, Mississippi Agr. Exp. Sta., State College.

Livestock Auction Sales in the United States (1939). Bul. No. 35, Director of Information and Extension, Farm Credit Administration, Washington, D. C.

Artificial Insemination in Livestock Breeding. Cir. No. 567, U. S. Dept. Agr., Washington 25, D. C.

Notes on Artificial Insemination of Sheep, Cattle and Horses. The Hoborn Surgical Instrument Co., London, E. C. 1. Price 1s.

Report, State Department of Agriculture (Nevada) for 1944. The most severe losses from diseases of animals was from hog cholera and anthrax. Anaplasmosis has increased in prevalence and constitutes a menace to the cattle industry of the state. Calf vaccination against brucellosis has been rather widely followed and is apparently meeting with success and general approval. Avian pneumoencephalitis was diagnosed in the state for the first time. A special permit from the quarantine officer is necessary to bring hog cholera virus into the state.

Veterinary Bulletin.—This winter number of the bulletin of the California Department of Agriculture deals almost exclusively with veterinary subjects, including: The veterinarian in modern war, Maintaining livestock in wartime, Forty years of animal disease control, Calf vaccination for brucellosis proving effective, We have come a long way, A respiratory disorder of chickens and turkeys, Two disease conditions of lamps, Staphylococci in a milk supply, Dourine appears in California, Vesicular exanthema of swine, California meat inspection, Paratyphoid and paracolon infections in chickens and turkeys, Feeding turkeys for health, A respiratory disease of young turkeys, California pullorum disease program, Factors influencing poultry mortality.—Vol. 32, No. 1, *Bul.*., California Dept. of Agr., 1943, Sacramento.